

SERICULTURE IN WEST BENGAL :
A Geographical Analysis

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P R E F A C E

This book is an attempt to bring forth a comprehensive account of prospects of sericultural activities in West Bengal. As is widely known, West Bengal once possessed a rich heritage in the art of producing quality silk piece goods which had attained international repute during the medieval and late medieval periods. This tradition continued right up to the beginning of the colonial rule in the state, during the latter part of which it gradually fell into a state of decay.

I have endeavoured to study the problems of sericulture industry in the State, chiefly during the post-independence era and have tried to highlight the geo-economic viability of propagation of sericultural activities in various districts from a geographer's point of view.

This is actually my doctoral dissertation in which the spatio-temporal framework in regional studies have been incorporated. In the first two chapters, the historical sequence of sericultural development in the state has been briefly outlined while in the third and fourth chapters an attempt has been made to evolve a regionalisation on the basis of localisation and sectoral pattern of sericulture. The spatial units thus selected form the focus of micro level analysis covering geo-economic, geo-cultural and geo-ecological aspects of growth, development and continuity of sericulture in the State.

In chapters five and six a detailed account of the sericulture proper involving the mulberry and non-mulberry sectors in relation to various stages of production i.e. mulberry-cultivation, silkworm rearing, reeling and weaving and manufacturing of silk piece goods have been discussed in detail. The indepth analysis of cost-benefit structure of the separate sectors located in different spatial units have been carried out based on empirical evidence. The intricate market mechanism with its imperfect system has been highlighted where the fundamental flaw in the operation of a monopoly-monopsony nexus has been established with supporting data. In chapters seven, eight and nine the international trade situation in silk commodities in relation to the country as a whole and West Bengal in particular, the existing growth constraints affecting the industry in individual geo-ecological niches have been focused.

Chapter ten exclusively deals with processes of diffusion that has taken place in the State in recent years. This has been made possible chiefly because of both extensive and intensive government efforts. Apart from

other provisions, availability of adequate bank credit facilities in the more remote rural areas have been proved particularly beneficial. The study has further revealed that with proper implementation of development programmes, sericulture sector will enable to sustain production for a longer period of time.

The concluding chapter reflects a critical appraisal of the geo-economic viability of sericulture development within the state, its future prospects and its possible effect on regional development.

On the whole, the book may provide a guideline for formulating developmental strategies in rural areas where the need to strengthen the existing local resource base is important. The agricultural sector may thus be further diversified and agro-based industries will enable to elevate the standard of living in rural areas by generating rural employment.

Finally, I want to express my indebtedness to Directorate of Sericulture and Silk-weaving, Handloom and Textiles, Government of West Bengal, Khadi Commission Central Silk Board, Government of India for rendering assistance in the course of my research work. I am also deeply grateful to Professor Bireswar Banerjee for his expert guidance and valuable suggestions during the preparation of this work.

CHAPTER I

INTRODUCTION

SERICULTURE IN THE PERSPECTIVES OF RURAL DEVELOPMENT

Emergence of Natural Resource Concept and Rural Development

In recent years great emphasis is put on utilisation of local resources in rural development. The subject of rural development is currently the most popular theme and the Governments, intellectuals, academicians, administrators and the people are all keenly interested in understanding, analysing and suggesting various ways and means of rural development.

India, being an agricultural country with bulk of its population being engaged in primary activities need to strengthen its rural base for balanced economic development. The prospect of creating a regional balance between rural and urban sectors, and providing employment to both these sectors can be achieved only through the proper exploitation and management of local resources and development of various agro-based industries. The initiative has to start from the grassroot level and the solution will come from the judicious exploitation process of allied/subsidiary sectors i.e. secondary and tertiary.

Development of Secondary and Tertiary Sectors

Looking at the present position of agricultural sector, it seems that, the thrust should be on agro-industrial development. The new ventures should be made to develop the allied sectors i.e. agro-forestry, agro-fishery, animal-husbandry, dairy farming and development of agro-based and forest based industries. These will be income generative, besides being able to provide employment to the large number of rural people. Considering the uncertain crop season, insufficient irrigation facilities and availability of other farm inputs, the exploitation of available local cash crops such as mulberry, cotton, jute, mustard etc. and developing them on a commercial scale for industrial purposes will prove to be extremely beneficial.

Sericulture as a Resource-Base Industry

In West Bengal the, geo-ecological condition is more or less ideal for mulberry cultivation and silk processing. The prospect of non-mulberry silk culture and subsequent processing of silk piece goods is also very high in western and northern districts. Mulberry is a cash crop and is three times more profitable than rice. As it has industrial processing sectors, it provides employment to a considerable number of people including women and

children of the rural households as well as urban-fringe areas. The average work ratio engaged in sericultural activities is taken as 5.5 persons per rural household.

The sericultural operations are conducted throughout the year and the tropical mulberry cultivation and silk worm rearing has additional advantage of providing employment to agriculturists even during the slack season. At present this sector acts as a supplementary source of income in most of the districts of West Bengal but this can become a full time occupation if production is organised and the marketing and distribution systems are channelised.

At present all the rural districts of India, as well as the State of West Bengal face the imperfect market situation which operates in a monopolistic-monopsonistic framework. This puts the sellers at a disadvantage, and the agriculturists/sericulturists, being fundamentally subsistent producers, often face irreparable financial loss. This in its turn generates a feeling of insecurity among the cultivators and a kind of apathy develops in the long run which becomes detrimental for innovative purposes. Another great disadvantage which the rural people face is, lack of proper education. This is most unfortunate for us to put in record that large number of sericulturists are illiterate. They are unaware of the product and factor markets, the vicious market nexus that operates in to-day's competitive situation. They have only their ingenuous skill, experience and expertise together with common intelligence with which to fight the increasingly sophisticated consumer market operations. Moreover, the sense of personal loss is so great among them that the attempts of integrating the disaggregated production sectors through the co-operative movements, in the rural areas, more or less became ineffective. The strong vested interests of the capitalist-monopolist groups become more powerful and in spite of the best efforts of the State Government and financial institutions the actual process of sericultural development has been somewhat stilted. Therefore, at the moment what is necessary is, an introduction of mass movement to eradicate illiteracy which is the root cause of underdevelopment and imbalance. Under the situation, a balanced development of sericulture in the districts may create a base for an overall regional development.

Impact of Sericulture on Rural Development

It has become evident from the empirical evidences that sericultural development has brought prosperity to the rural people. In areas where agriculture is restricted particularly in the western and northern districts, the development of forest based tasar and criculture and their subsequent

processing have provided employment to a large section of tribal families, whose only source of income has hitherto been rudimentary agriculture and collection of forest products. Even in the agricultural belt of central and southern districts mulberry culture and silk-worm rearing has become very popular, as this crop can be cultivated on non-agricultural or waste land. As such mulberry crop does not stand in competition with either food or cash crops. In the traditional areas of Malda, Murshidabad Birbhum, Nadia etc. a large scale diffusion programme is initiated. Recently, the adjoining areas of West Dinajpur, having the advantage of being contiguous with Malda and North 24-Parganas, in continuity with Nadia have been brought under mulberry cultivation. The practice of silk reeling and weaving have become popular of late, and the villagers with the help of Government assistance and financial aid are taking up sericulture as their subsidiary occupation. A large quantity of silk cocoons, silk yarn and fabrics are produced annually both by the private enterprises and registered units. The dyeing and printing sector of sericulture provides employment to a large number of urban dwellers in and around Calcutta and Serampore. The prospects of exporting tasar fabric is also very good. The sericulture sector, therefore, calls for a special attention as far as planning and development is concerned.

General Outline

West Bengal possesses an old cultural heritage in the art of silk-worm rearing and weaving of silk fabrics. Historical evolution of such a specialised occupational structure may be attributed to an intricate network of socio-cultural fabrics of the people living in the rural areas of Bengal. It may, however, be noticed that sericulture has maintained a systematic phase of prosperity and decay in this state since very early periods of history. This naturally left it impressed on the domestic and overseas trade of silk yarn and fabrics of the region.

A chronological sequence of its various stages of growth is difficult to ascertain because of the lack of systematic records of the period. An organised development of sericulture and its proper exploitation as a resource was first initiated by the British East India company under whose patronage the industry flourished for about a century. The British traders were instrumental in introducing market economy in sericulture, the essential structure of which is still being retained even today, except in certain superficial modifications. The subsequent decline of sericulture is partly due to degeneration of silkworm races, administrative and various other organisational problems. After independence, control over the

industry fell into the hands of private capitalists who were originally company agents. This structural shift was found to be detrimental to the healthy growth of this industry. The trend is very much in vogue even now.

During the colonial period, the main emphasis was on production of filature silk yarn solely for the purpose of export, though the art of weaving was very much developed in some centres of Murshidabad, Malda and Birbhum districts. The production centres were systematically selected at areas of best locational advantages and the process of specialisation has become apparent since then. This explains the localisation pattern of sericultural operations at selected areas of the state. However, the development strategy adopted in West Bengal after independence has given a new dimension in the process. The efforts of the State Government are recently geared to revitalise the people engaged in this occupation. A detailed investigation of the comparative advantages of the geo-economic determinants of sericulture reveals that 11 out of 16 districts of West Bengal are suitable in sericulture, both in the culture of mulberry as well as non-mulberry silkworms and preparation of fabrics from it. It may be of interests to note that despite infrastructural facilities, West Bengal still lags far behind Karnataka in the field of sericulture. Inadequate co-ordination of facilities between the vertical sectors of production and a retarded areal expansion of mulberry lands may be considered as the major contributory factor for such backwardness. Due to high man/land ratio, there are paucity of agricultural lands in West Bengal. As such the marginal and fallow lands can only be brought within the purview of mulberry cultivation. This keeps down the production of mulberry leaves. Moreover, such introduction of mulberry farming on marginal lands requires technological and institutional inputs which are capital intensive. Therefore, it is difficult to motivate the farmers in such occupations on a large scale.

To overcome this constraint, recently the State Government along with a few philanthropic organisations like Lutheran World Service (LWS), have undertaken special extension and development programmes for the revival and strengthening of sericulture in this State. Several integrated projects have been taken up and sericulture has been gradually expanding in hitherto unknown areas of the northern and western districts from its original nucleus at Malda. In some places the traditional pattern of production has been largely retained, with the integration of specialised activities, while at others segregation has become apparent, depending on the suitability of that region. In most cases, the sericulture units have become economically viable. Sericulture is now providing full and part-time employment to over 400,000

people in the State, most of whom are in rural areas. The State also earns about Rs. 14 million worth of foreign exchange for the country in a year, by the export of its various products. Recent experiments also reveal that the non-mulberry sector of sericulture also holds good promise in West Bengal. If properly developed, this can also ensure a better standard of living of a large number of tribal population presently living below poverty line. Therefore, in the context of socio-economic uplift of the backward classes, sericulture holds immense possibilities. With a view to achieving this objective, the main thrust should be exerted to minimise the inter-regional as well as inter-sectoral and intra-sectoral disparities in the field of silk production in the State.

The introduction of integrated sericulture through co-operatives and other institutions and at the same time encouragement of inter-regional migration of sericulturists are some of the measures adopted by the authorities to fulfill above-mentioned objectives. However, it may be added that the success of such efforts will depend largely on their proper implementation.

.Aims and Objectives

The study aims at investigating the spatiotemporal components of sericulture activities in West Bengal. The specific purpose of the study is to examine the various socio-cultural and economic attributes of the people, which have led them to adopt sericulture in some areas and ignore the same in other areas, though bio-ecological factors are congenial in both the areas. This has naturally resulted in wide variations in its localisation pattern in this State.

The study envisages to find out the apparently unexposed covariants of such phenomena, and also to identify the micro-level distinctions between the different factors of production in each sector. In view of the existence of an intricate network of market mechanism in a dual economy with a set of intermediaries, the aspects of commodity transaction in each sphere need to be studied in considerable depth. In this connection the role of institutional finance vis-a-vis other agencies for its growth and revitalisation requires careful investigation.

The specific purpose of these co-variant analysis is to identify the prospective areas where sericulture can be propagated - the areas which are likely to be both ecologically as well as economically viable zones for its introduction. The future prospect of commercial expansion of silk production in the State depends on such programmes. Introduction of sericulture in new areas is likely to face multiple constraints covering

geographical, economic, cultural, political and administrative mechanisms and as such the need for an integrated analysis to such constraints cannot be ruled out. Taking into account all these aspects, the present study proposes to set a guideline for future planning and development of sericulture in West Bengal.

In view of the economic recession through which the country is now passing, an already existing cottage industry with commercial viability and high export potentiality seems to be an ideal strategy for regional development. This will be of help to the people of the rural areas as primary producers and marginal cultivators are likely to be benefited most by this labour intensive avocation. In short, the aim and objective of the present study is to formulate a comprehensive programme for an efficient use of this viable resource of West Bengal in the context of its role in the overall regional development. In view of the commitment of the government in area development programmes to foster economic development, sericulture can certainly play a significant role in the State. The potentiality of the State in this respect has been portrayed in the present analysis. The economic development at the area level can be achieved through :

- i) creating employment opportunities in the sericulture sector,
- ii) improving the income-level of the cultivators and rural craftsmen (artisans/weavers),
- iii) involving the unutilised labour force of the backward areas in this programme,
- iv) augmenting foreign exchange earnings through export of silk fabrics,
- v) involving the small traders and entrepreneurs in silk trade by providing institutional credit.

These in turn will lead to an increased capital investment in the rural areas, thereby creating a multiplier effect on the regional economy.

Finally, to achieve the above-mentioned objective, it is necessary to give special attention towards integrating the various processes of sericulture - viz. , cultivation of mulberry, rearing of silkworms, production of silk yarns and weaving of fabrics. This farming and manufacturing process should then be integrated into marketing operations of both the domestic and overseas sectors. The need for such an integration in the various sectors of mulberry and non-mulberry bases and sericultural operations in the State has been adequately focused in the study.

CHAPTER II

HISTOGENESIS OF SERICULTURE IN WEST BENGAL

West Bengal has a very old tradition of mulberry based sericulture which dates back to medieval and late medieval periods. Historical evolution of such a specialised occupational structure may be attributed to an intricate network of socio-cultural fabrics of the people living in the rural areas of Bengal. It may, however, be noticed that sericulture has maintained a systematic phase of prosperity and decay in this state since very early periods of history.

Earliest references of silk garments are found in epic literatures and on the basis of these evidences a group of experts are of the opinion that Indians discovered it in the sub-Himalayan region independent of the Chinese, who discovered silk earlier in their own country.

Development of Sericulture in Bengal upto Pre-independence Period

Bengal silk came to prominence during the Muslim regime in the 13th century and the Moors exported this commodity to European markets.

The silkworm which used to be reared in Gangetic Bengal was an indigenous multivoltine heat resistant variety commonly known as "nistari" (*Bombyx crasis*). Apart from this, other varieties of silkworm, i.e. *Bombyx textar*, *B. fortunatus* and *B. sinensis* were also prevalent in Bengal. At this time a large silk industry existed which carried rearing, reeling and weaving operations. From the travel accounts of medieval and late medieval writers, i.e. Francois Bernier (1656-1668 A.D.), J. B. Tavernier (1676 A.D.), George Forster (1808), one can reasonably guess the flourishing condition of the silk industry under the Dutch, the Portuguese and the English merchants. Bengal raw silk was primarily meant for export in the Middle Eastern and European countries during this period.

An organised development of sericulture and its proper exploitation as a resource was first initiated by the British East India Company under whose patronage the industry flourished for about a century. The British traders were instrumental in introducing market economy in sericulture, the essential structure of which is still being retained even today, except in certain superficial modifications. The subsequent decline of sericulture is partly due to degeneration of silkworm races, administrative and various other organisational problems. After independence control over the industry fell into the hands of private capitalists who were originally company agents.

This structural shift was found to be detrimental to the healthy growth of this industry. The trend is very much in vogue even now.

The sericulture industry of West Bengal presents the traditional laws of industrial location, being situated in the areas of raw material source. As sericulture is an agro-based industry, the major concentration is found to be in the rich agricultural belts of Malda-Murshidabad, Birbhum and parts of Bankura in the west and West Dinajpur in the north. During the colonial period, the main emphasis was on production of filature silk yarn solely for the purpose of export, though the art of weaving was very much developed in some centres of Murshidabad, Malda and Birbhum districts. The production centres were systematically selected at areas of best locational advantages and the process of specialisation has become apparent since then. This explains the localisation pattern of sericultural operations at selected areas of the State.

Analysis of Continuity and Change in the Structural Sector of Sericulture

However, the development strategy adopted in West Bengal after independence speak for the present trend in the development economics. The changed economic situation resulted in a structural shift from the natural-resource-base-exploitation to human-resource-base-exploitation. The nature of operation of both factor and product markets were taken into consideration and over the years more emphasis is put on the people engaged in sericulture. The human factor, that is, availability of a large number of agricultural population who remain practically idle for a considerable period of the year were effectively mobilised in the industry. Sericulture, being basically labour-intensive absorbed this surplus labour readily. In this context it may not be out of place to mention that as far as development strategy in the post independence period was concerned, West Bengal voluntarily accepted the lines of cottage industry/handloom type development. Karnataka on the other hand opted for powerloom and machine /filature based development. As a result, sericulture in West Bengal remained in the domain of subsistence type of mulberry-culture-silkworm rearing, charkha/country basin or semi-mechanised type of reeling, and handloom based weaving characteristics, while Karnataka became famous for large-scale commercial type of mulberry-culture, silkworm rearing, mechanised and filature based reeling and powerloom weaving. Unlike West Bengal, sericulture in Karnataka is non-traditional in character. As such, the State usually receives liberal financial assistance from the central Government. Consequently, the management and decision-making bodies

of the State have taken particular care in various operations in sericulture, like steady supply of irrigation water for mulberry fields thereby increasing the yield of leaves for silkworms, fixation of cocoon price, mechanised reeling operations, construction of filatures etc. All these have helped the state to attain a leading position in sericulture in the country.

In Jammu and Kashmir, the entire sericulture operation is nationalised. Therefore, the development has been steady. On the contrary, West Bengal, due to its traditional skill and geo-economic congeniality in both mulberry culture and silkworm rearing has been able to sustain its present growth in silk production despite financial constraint and lack of mechanisation in its reeling sector.

As it stands, the share of West Bengal in raw silk production is 14.61 % of the entire country. The percentage share of West Bengal to India in respect of number of active reeling units is 19.5 %. During 1977-78, sericulture in West Bengal gave employment to 10.7% of labourers engaged in this occupation in the country. It is envisaged that during 1982-83 West Bengal's participation in the total employment of sericulture will record a marginal increase to 12.5.

Table 2.1 (a)

Comparative analysis of sericulture units and production sectors in different States of India, 1977.

States	Area under mulberry (ha)	Number of districts having sericulture	Number of villages having sericulture	Production of cocoons (in '000 kg.)	Production of raw silk (mulberry) (in '000 kg.)
West Bengal	8,107	11	1,152	677,000	450
Karnataka	110,171	18	6,328	3,359,400	2,486
Tamil Nadu	5,160	12	1,004	137,500	24.9
Uttar Pradesh	334	20	324	8,200	5.6
Jammu and Kashmir	233	9	2,751	74,200	45.0

(Source : Statistical Biennial, 1978, Central Silk Board).

Table 2.1 (b)

Comparative analysis of sericulture units and production sectors in different States of India, 1986

States	Area under mulberry (ha)	Number of districts having sericulture	Number of villages having sericulture	Production of cocoons (in '000 kg.)	Production of raw silk (mulberry) (in '000 kg.)
West Bengal	12,893		1,700	9,800	750
Karnataka	132,420		13,200	4,300	4,300
Tamil Nadu	29,418		4,655	1,000	833
Uttar Pradesh	2,586		450	238	23
* Jammu and Kashmir	632		2,270	642	34

(Source : Statistical Biennial, 1986, Central Silk Board).

Table 2.2 (a)

Production of silk fabrics and labour employment in sericulture, 1977

States	Production of fabrics (in metre)	Employment (no.)	Number of handlooms	Number of powerlooms
West Bengal	990,000	408,000	8,866	10
Karnataka	54,702,010	2,460,000	7,500	3,363
Tamil Nadu	548,614	75,000	40,000	44
Uttar Pradesh	123,244	6,000	30,000	159
Jammu and Kashmir	990,000	108,000	1,506	289

(Source : Statistical Biennial, 1978, C. S. B. Bombay).

Table 2.2 (b)**Production of silk fabrics and labour employment in sericulture, 1986**

States	Production of fabrics (in metre)	Employment (no.)	Number of handlooms	Number of powerlooms
West Bengal	16,170,000	255,040	12,800	—
Karnataka	92,708,000		22,800	23,300
Tamil Nadu	17,959,480		40,000	—
Uttar Pradesh	495,880		60,000	5,000
Jammu and Kashmir	733,040		1,500	290

(Source : Statistical Biennial, 1986, Central Silk Board).

* Data refers to 1984-85.

It becomes apparent from Table 2.2 that almost all the states have filature silk, while West Bengal is the only state which depends mostly on handloom silk. This has detrimental effects on the quality of fabrics and consequently the demand becomes less. The percentage share of West Bengal to India in respect of number of handlooms is only 20.64.

Table 2.3
A comparative study of sericulture in West Bengal

	India				West Bengal			
	1951-52	1971-72	1977-78	1987-88	1951-52	1971-72	1977-78	1987-88
Area								
Mulberry (ha)	65,732	104,855	131,094	217,839	5,059	4,380	8,374	14,720
Production of cocoons (in '00 kg.)	511.7	946.0	1,182.4	76,717	271.4	234.9	6,750	10,100
Production of raw silk (kg.)	571,000	1,995,000	3123,000	7,029,000	171,814	52,219	450,000	780,000
Production of fabrics (in '000 m)	12,562	43,890	68,706	154,638	3,780	1,149	9,900	17,160
Number of persons employed	N. A.	N. A.	3806,000	515,200,000	147,500	N. A.	408,000	286,085

(Source : Statistical Biennial, 1978, Directorate of Sericulture and silk-Weaving, 1975, Govt. of West Bengal, Calcutta).

From the above analysis (Table 2.3) it becomes clear that although West Bengal has substantially improved her area under mulberry (which is 6.38% to the country's total) and also in cocoon production in recent years, she lags behind the other States in the programme of modernisation, particularly in the reeling sector. The industry is still at a developing stage and the micro-level problems in each sector need further investigation.

Besides mulberry silk, West Bengal has tasar and ericulture. In the field of non-mulberry silk production the share of this State in the country was recorded as 2.54% in 1977 (vide Table 2.4).

Development of Sericulture During the Plan Periods

Sericulture and silk weaving under the handloom sector were highly disorganised in the State, prior to inception of First Five Year Plan in 1951. The industry at that time was facing various problems of production constraints such as non-availability of high-yielding variety of mulberry seedlings, lack of seeds of improved strains, inadequate rearing facilities, absence of a well-organised reeling arrangement, wide fluctuations in the prices of cocoons and raw silk, lack of proper storage facilities for seed as well as commercial cocoons etc.

The entire sericulture activities were left in the hands of cultivators and reelers-weavers who were unable to cope with the rising demand for silk fabrics, together with the smooth functioning of the disaggregated sectors of silk production.

Therefore, with the object of improving the economic conditions of the sericulturists and village artisans-weavers in the rural areas and at the same time to meet the domestic demand for silk fabrics, the Government of India in collaboration with the State Government initiated a programme for sericulture development in West Bengal.

The First plan 1951-56 : During the first plan a sum of about Rs. 700,000 was allotted for introducing the high yielding variety of mulberry plants in the plain as well as in the northern hills of the State. Out of this, a sum of Rs. 237,500 was spent. The output of silk yarn during this period was increased from 136,900 kg. to 164,500 kg. recording 12.0% increase. By the end of the First plan the mulberry areas were increased from 4,605 to 4,935 hectares.

Second plan (1956-61) : During the Second 5-year plan, greater emphasis was put on the introduction of mulberry grafts, development of seed organisation and modernisation of reeling basins. Out of total allocation of Rs. 8,654,000 a sum of Rs. 2,326,000 was spent. By the end of the Second

Table 2.4
Production of non-mulberry silk and employment potential

	India			West Bengal		
	1951	1971	1978	1951	1971	1978
Production of non-mulberry silk (Kg.)						
(a) Tasar	123,609	371,005	434,242	4,500	9,000	9,000
(b) Eri	100,204	161,251	55,914	675	3,700	6,000
*Production of fabrics (m)						
(a) Tasar	1,483,308	4,452,060	5,210,904	54,000	108,000	108,000
(b) Eri	1,202,448	1,935,012	67,968	8,100	44,400	72,000
Employment potential (Persons)						
(a) Tasar	N. A.	N. A.	N. A.	6,000	N. A.	N. A.
(b) Eri	N. A.	N. A.	N. A.	1,300	N. A.	N. A.

(Source : As in Table 3) *Production of fabrics estimated.

Five Year plan, the mulberry areas recorded an increase of 25.65%, bringing the total area under the plantation to 6,355 ha. The production of silk yarn, however, registered an increase of over 40.24% raising the total to 230,700 kg.

Third plan (1961-66) : During this period, greater emphasis was laid on mulberry cultivation as well as on the production of seeds. The salient feature of this plan was the introduction of a filature unit with 100 basins at Madhughat with a view to improving the quality of silk yarn. Out of total amount of money sanctioned, only 52.84% was utilised. However, the development has been quite significant after the 3rd plan period. The per hectare productivity of silk in the country was increased significantly from 10.02 kg. of raw silk in 1951-52 to 23.82 kg. in 1977-78 recording an overall increase of more than 138 p .c. In West Bengal, the mulberry plantation indeed recorded an additional increase of 4.0%, bringing the actual figure to 6,567 ha. and silk yarn production also registered substantial increase, recording to 312,400 kg. at the end of the Third plan period.

Fourth plan (1969-74) : The 4th five year plan gave equal emphasis on the extension of mulberry area and increased production of yarn. However, the flood devastation of 1971-72 and the subsequent drought spell of 1972-73 seriously affected mulberry farming bringing down the yarn production and a shrinkage in total area. The State Government took immediate steps to rehabilitate the industry and a sum of Rs. 6,400,000 was allocated for the purpose. The mulberry areas recorded a decline in area (5,808 ha). The yarn production also recorded a decline - viz., 285,800 kg. by the end of the 4th plan period.

Fifth plan (1974-79) : During the Fifth Five Year Plan, an all-out effort was made to make sericulture an economically viable sector of the State economy. Apart from the measures already discussed, various new aspects were taken into consideration. For the first time institutional finance through banks was arranged, and a separate Directorate of Sericulture was formed. The principal purpose of the department is to look after the interests of sericulturists and take appropriate actions etc.

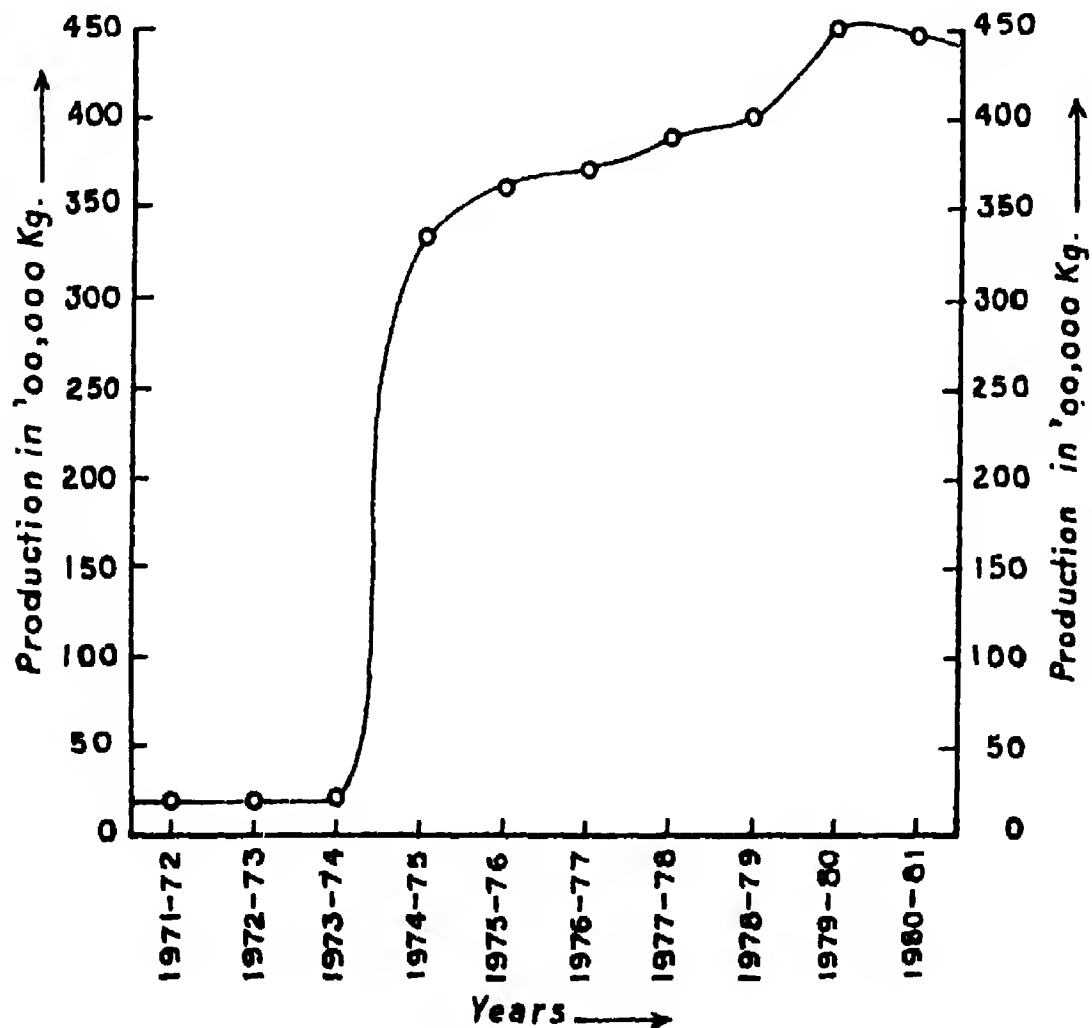
During this period, a sum of Rs. 4,945,000 was sanctioned as subsidy and loan to the sericulturists to enable them to construct scientific and modern rearing houses and remodelling of the existing ones, provide irrigation facilities, purchase of implements and inputs, construction of new buildings for production of disease-free laying etc. The subsidy was disbursed subject to an advance of 50% of the project cost as bank loan, 25% subsidy from State Government and 25% as entrepreneurs

Table 2.5
A comparative analysis of the growth of sericulture in West Bengal with India

	1951-52	1956-57	1961-62	1966-67	1971-72	1975-76	1980-81
INDIA							
Area under mulberry (in ha.)	56,732	69,136	82,247	84,738	104,885	124,913	
Production of silk (in kg.)	571,000	1,053,000	1,210,000	1,492,000	1,995,000	2,468,000	5,990,000
WEST BENGAL							
Area under mulberry (in ha.)	4,605	4,935	6,355	6,576	3,075	7,234	9,406
Production of silk (in kg.)	136,900	164,500	230,700	312,400	160,000	300,00	505,000
Percentage of West Bengal to India :							
Mulberry area	8.11	7.13	7.72	7.76	2.93	5.79	
Silk Production	23.97	15.62	19.06	20.93	8.02	12.15	8.43

(Source : Compiled from the Records of Central Silk Board, Government of India and Directorate of Sericulture and Silk-Weaving, Govt. of West Bengal).

PRODUCTION OF SILK YARN (1971-1981)



PRODUCTION OF COCOON (1971-1981)

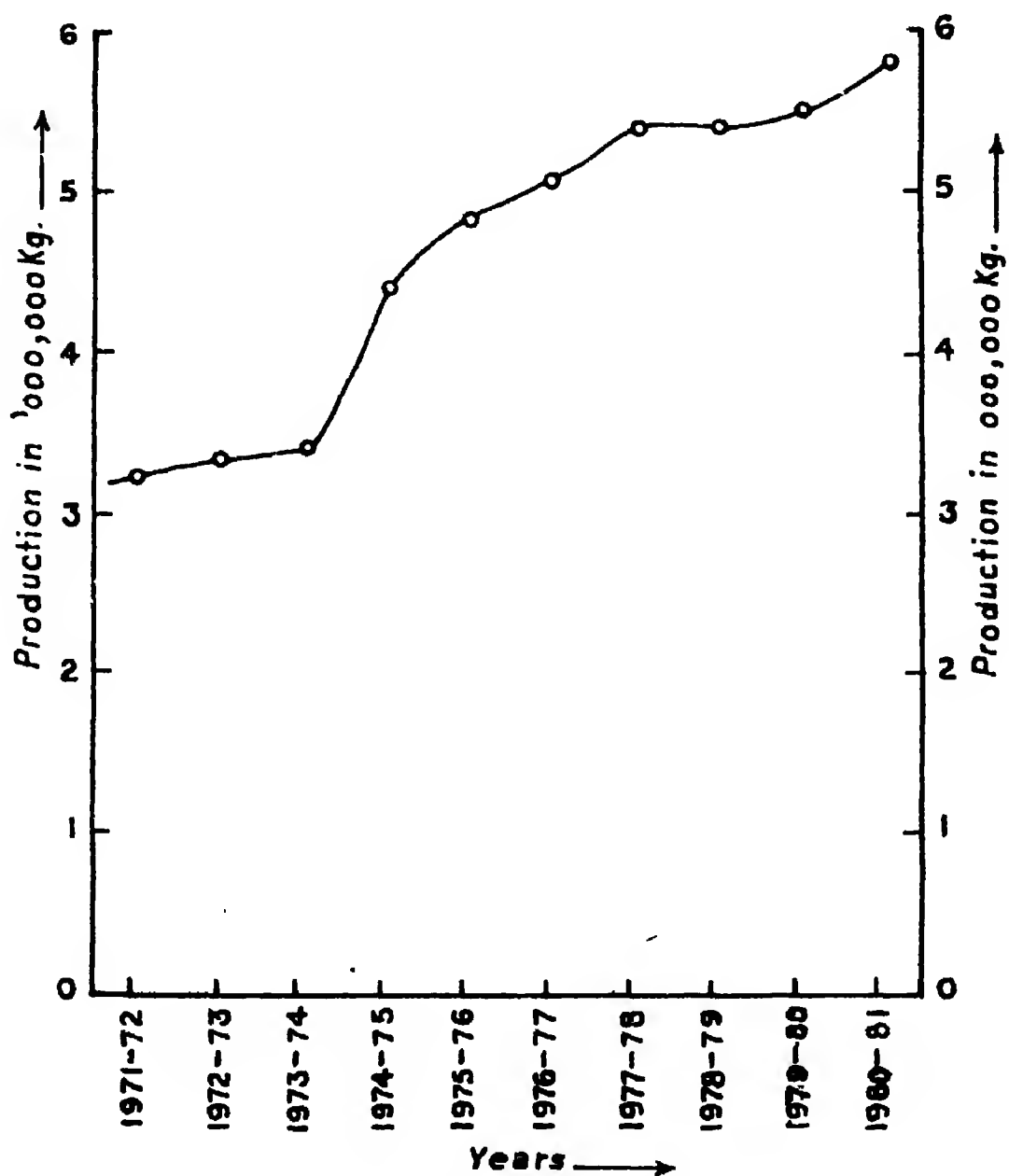


Fig. (11)

GROWTH OF MULBERRY AREA (1971 — 1981)

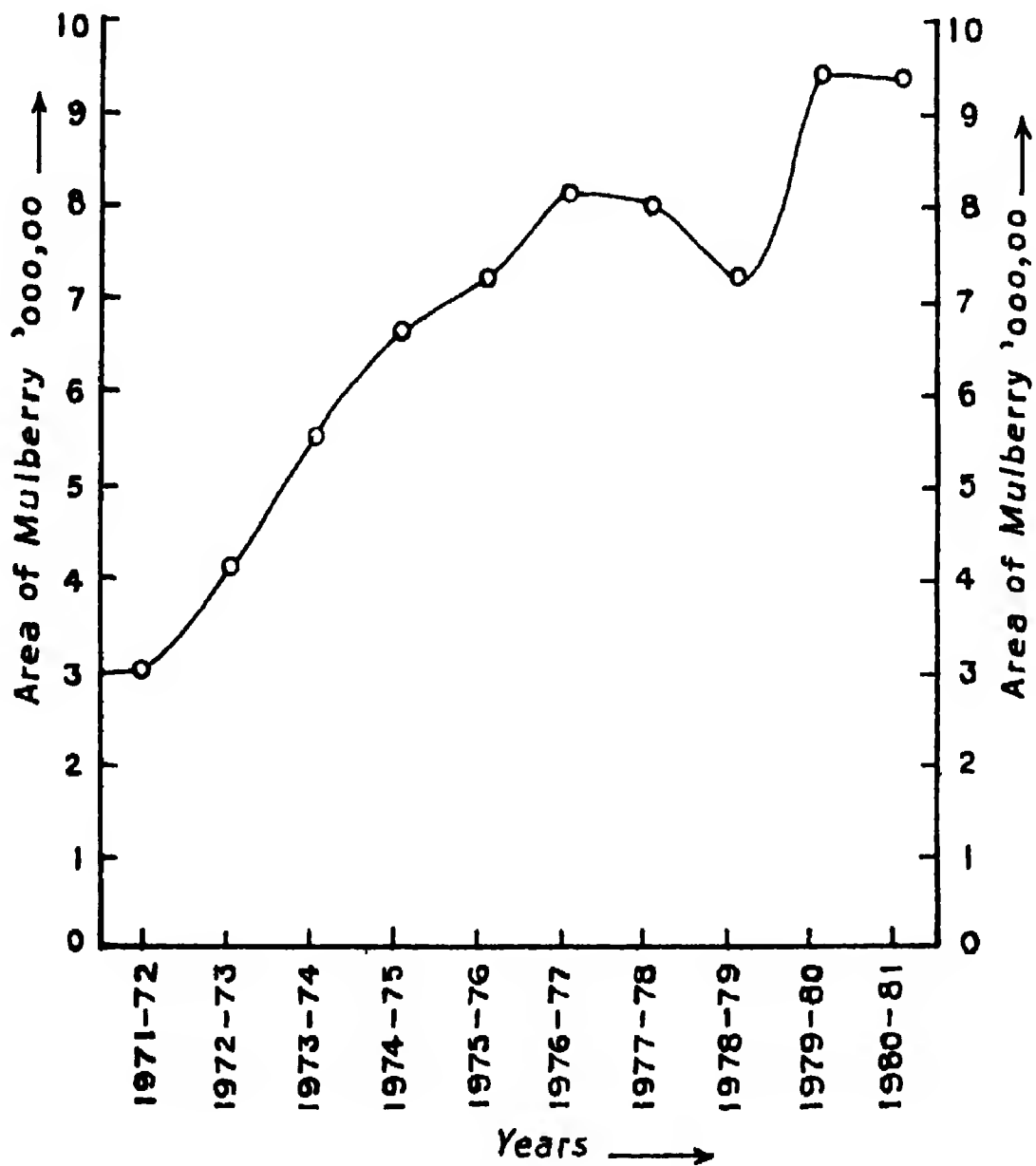


Fig (iii)

contribution. This kind of assistance has proved to be beneficial and several entrepreneurs have become interested in sericulture in non-traditional regions of West Dinajpur, Birbhum, Darjeeling, Coochbehar and Jalpaiguri. Some nationalised banks particularly the United Bank, State Bank, Allahabad Bank, District Central Co-operative Bank and Gour Grantin Bank have done pioneering work in this field. The subsidy incurred towards the implementation of the scheme was Rs. 3,208,107, benefiting about 3,700 persons.

Moreover, in order to introduce sericulture in the non-traditional regions, composite units have been set up and government grainages are built from where disease free layings are now supplied to the commercial rearers. The areas benefited are Dakshin Bhahanipur (W. Dinajpur), Hemtabad (W. Dinajpur), Raiganj (W. Dinajpur), Sriniketan (Birbhum), Baswa (Birbhum), Nalhati (Birbhum), Ranaghat (Nadia) etc. Besides these, 44 private grainages have been set up through bank finance with an annual capacity of 20,000 disease-free layings. The Piasbari Nursery at Malda has been electrified for the functioning of cold storage to preserve bi-voltine eggs for rearing during the winter months in the plains. A sum of Rs. 47,000 had been sanctioned for improving water supply facilities to the existing unit at Raghunathpur (Purulia).

Mention should also be made of the Hill Development Programme undertaken during the 5th plan Period to expedite sericulture in Darjeeling district, particularly in the introduction of bi-voltine variety and much has been achieved since then (Vide Chap. V). In the drought prone areas of Bankura, Midnapore and Purulia, a sum of Rs. 3, 641,000 has been spent for the development of sericulture (non-mulberry). Under the tribal sub-plan, steps have been taken to introduce sericulture in the tribal areas.

It is of interest to note that mulberry culture and subsequent production of silk yarn have remained more or less stabilised in West Bengal since 1976 (Vide Table 2.5). Yet, the contribution of the State to national total is insignificant. Therefore West Bengal will have to strengthen her production sector during the coming years.

The mulberry areas of the State, however, have recorded a steady increase during the last 10 Years (Vide Table 2.6 and Fig. 1i, ii, and iii).

Table 2.6
Growth of mulberry areas in West Bengal, 1971-81

Year	Area under mulberry (ha)	Production of cocoons ('000 kg.)	Production of raw silk ('000 kg.)
1971 - 72	3,075	3,260	20
1972 - 73	4,100	3,300	21
1973 - 74	5,535	3,412	22
1974 - 75	6,623	4,397	335
1975 - 76	7,234	4,850	363
1976 - 77	8,107	5,165	369
1977 - 78	8,028	5,411	390
1978 - 79	7,234	5,435	402
1979 - 80	9,405	5,578	450
1980 - 81	9,406	5,796	445

(Source : Directorate of sericulture and silk-weaving, Govt. of West Bengal).

From the above analysis, it has become apparent that despite various growth constraints, sericulture in West Bengal is making slow progress and has become an important part of the State economy.

The geo-economic viability of West Bengal has helped the state to increase the production of cocoons and silk yarn. The future growth strategy therefore should focus on regional development of sericulture in the viable areas.

Role of Sericulture in State Economy

Since independence, West Bengal had to face multiple economic and socio-political problems with detrimental effects on the State economy. In this context, particular attention should be drawn towards the rural sector which is burdened with the problem of low capital investment, low cash return, unemployment, low per capita income and progressive growth of population. As a result most of the villages of West Bengal present the characteristics of a backward economy.

Growth of sericulture can play a secondary role in the improvement of rural economy. It can supplement the low per-capita income of the poor agriculturists at an initial stage. Later it can be developed as a primary source of income. It is desirable that along with agricultural development, other activities like handloom weaving, agro-based industries etc. should also be simultaneously encouraged so that the rural sector becomes

economically viable. Sericulture with its sectoral aspects of production, gives employment to different sections of population specialised in cultivation, rearing, reeling and weaving. In this way, sericulture helps in the growth of rural economy and creates a balanced economic sector. It also helps in mitigating migration of rural population towards the overcrowded metropolitan cities. The vast number of underutilised labour in the rural areas are absorbed in sericulture as it is labour-intensive. It also provides an assured income to a substantial section of the marginal farmers of the State.

Considering the present demand of silk fabrics, both of mulberry and non-mulberry categories and studying the future export potentialities, it is felt that sericulture has the viability of becoming a profitable sector of the State economy. As the major silk exporting countries of the temperate region have restricted their export, India gets an ideal opportunity to capture the world market by increasing her present target of production. Moreover, tropical sericulture has some economic advantages over the temperate one as in the former climate multi-voltine silkworms can be reared throughout the year. In temperate regions on the other hand, the cocoons can be reared only once (uni-voltine) or twice (bi-voltine) in a year.

Therefore, West Bengal having a tropical climate can utilise the existing potentialities in the field of sericulture and increase her silk production. Further, sericulture fetches more cash return than traditional farming. Therefore, sericulture enjoys the acceptability of the village communities in the non-traditional regions. In this way sericulture can be introduced in the areas which are otherwise unsuitable for crop cultivation. Thus in the rural areas additional lands are brought under mulberry cultivation and subsequently silkworm rearing is practised wherever climate is congenial. In brief it could be pointed out that sericulture plays a viable role in the State economy as it brings in additional areas under cultivation, generates more income, provides greater employment opportunities and helps in the overall development of a region.

CHAPTER III

GEOGRAPHICAL ENVIRONMENT AND SERICULTURE

Geo-ecological Conditions vis-a-vis Sericulture

Natural environment plays an important role in the development of sericulture in West Bengal. Sericulture involves a combination of agricultural, biological and manufacturing processes. It is imperative to propagate the cultivation of mulberry plants, rearing of silkworms and subsequent manufacturing operations in the process. Natural environment has a direct influence on the cultivation of mulberry and rearing of cocoons. It exerts an indirect influence on manufacturing operations as well. Of the several physical variables, the following are important for mulberry cultivation and silkworm rearing :—

- 1) Terrain
- 2) Drainage
- 3) Climate
- 4) Soils

Terrain Pattern :

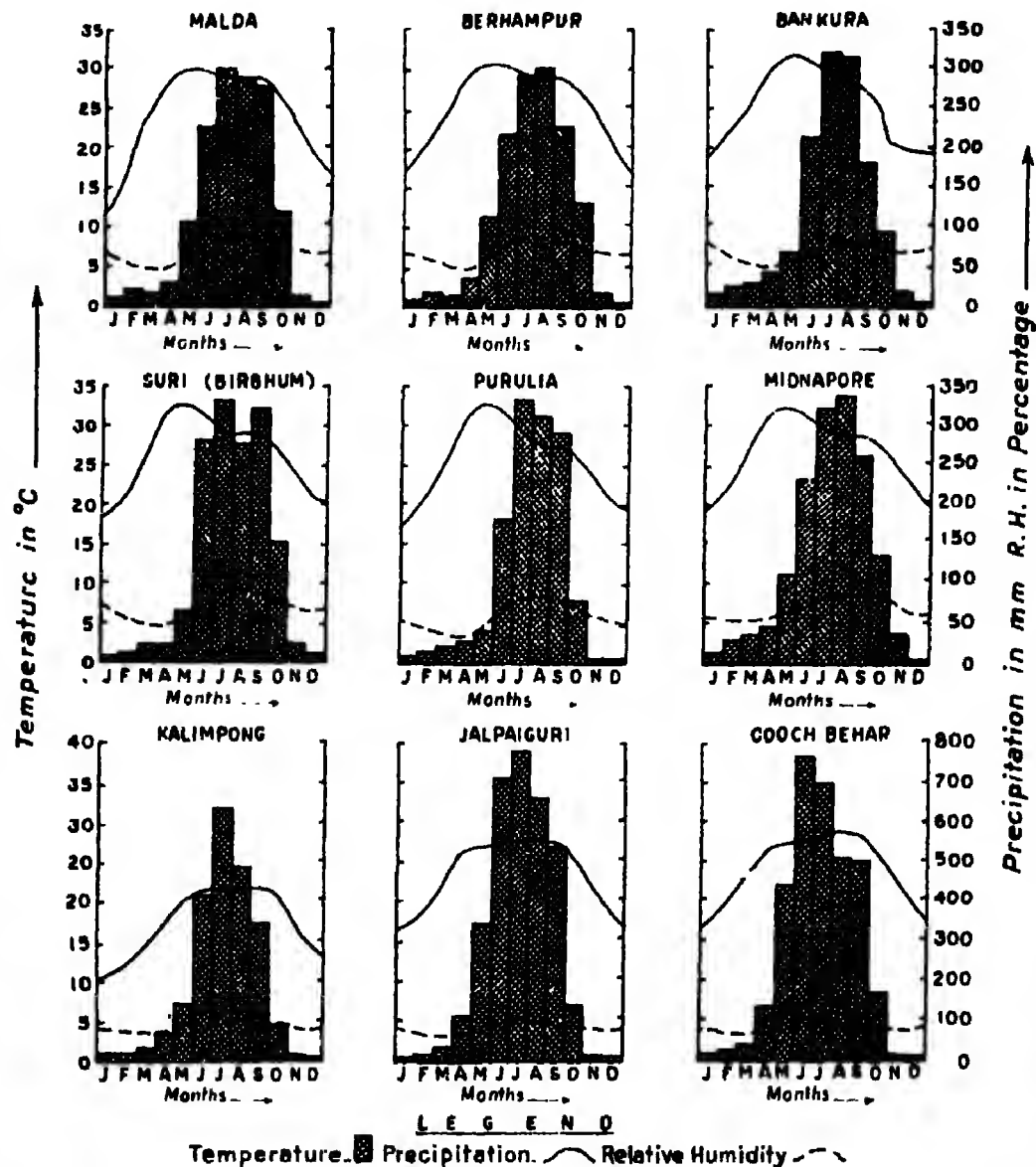
The basic requirement for sericulture is the supply of mulberry leaves, which are the principal food of the silkworms. Therefore mulberry cultivation or 'Moriculture' is an integral part of sericulture. For the cultivation of mulberry, slightly raised upland surfaces are required. Although mulberry is a hardy crop and can be grown on any terrain type, it prefers slightly raised alluvial flat lands. On rough mountainous terrain, it can also be grown as it is in case of Darjeeling district, particularly at Kalimpong sub-division at an altitude of about 900-1650 m.

Low lying flood plains are unsuitable for mulberry cultivation because the plant cannot sustain water-logging. Therefore, preferably the uplands and river embankments are selected for its cultivation.

In West Bengal, mulberry is usually grown in the plains with average elevations varying between 10-40 m. while in the plateau sections in between 60 to more than 280 m.

Everywhere, the average elevation of mulberry lands is 1m. to 2m. above the general surface of the surrounding land. Mulberry cultivation is usually concentrated in the districts of Malda, Murshidabad, Bankura, Birbhum,

CLIMATIC PARAMOLLER OF MAJOR SERICULTURE STNS. IN WEST BENGAL



West Dinajpur and Darjeeling. Excepting in Darjeeling, mulberry is cultivated on the alluvial lands, either on raised surfaces or on the river embankments.

Drainage Pattern

Mulberry prefers well-drained surface as the plants are damaged in water-logging. The plant needs plenty of water during the growing season. As such, a perennial supply of water throughout the year results in good leaf harvest. The crop can be grown mostly round the year. In West Bengal, however, both in the plains as well as in the hills, there is paucity of irrigation water. In the plains supply of water during the pre-monsoon and in winter months is scanty. Lack of adequate irrigation water during these periods results in plant decay. Incidentally it may be mentioned that only 5% of the total mulberry land of the State gets the benefit of irrigation. Bulk of this irrigated land is, however, located in Birbhum district.

Climatic Characteristics

The various components of climate play important role in mulberry cultivation and silkworm rearing. Any variation in temperature, rainfall or humidity conditions, therefore, may affect the cultivation of mulberry plants or rearing of cocoons at different harvesting seasons (Vide Fig. 2).

Mulberry prefers mild temperature, generally not exceeding 26°C. Formerly mulberry was considered as a plant of the temperate regions. But now it thrives quite well in tropical and sub-tropical climates.

For the rearing of silkworms, high humidity is found to be injurious. As such, there is a need to maintain an optimum level of temperature and humidity within the rearing chamber during the rearing season. The average room temperature should be within 20-25°C and humidity between 70-90% at the various stages of the life cycle of silkworms. Because of their climatic preferences, the types of mulberry plants as well as the variety of silkworms are carefully selected to fit in the local climate.

In West Bengal the *Morus indica* variety of mulberry is usually cultivated. The *Kosen* variety of Japan is, however, preferred in Darjeeling hills. Depending on their species, mulberry plants may be of i) bush, ii) high bush, and iii) tree type. Of these the most common are the bush and high bush types which are cultured throughout the plain region but tree types are occasionally found in the hill region. In the plains of West Bengal rearing of cocoons is much affected by high temperature and high humidity. During summer, the temperature occasionally shoots up to 40°C and during the monsoon season the humidity is above 90%. To cope with this high

temperature and humidity conditions an indigenous variety of cocoon is usually reared here. This is known as 'Nistari' variety which is a multi-voltine, heat-resistant type. The cocoons raised from this species do not, however, give uniform yield. During the summer harvest (April-May), the crop yield is much less, and the rearing operations are practically confined in the hill region limited to high-yielding bi-voltine silkworms. In recent years, due to persistent efforts of the sericulturists, it has been possible to rear high-yielding bi-voltine variety of cocoons in the plains during winter months.

Soil Characteristics

It has been found that dry clay loam soils having a pH value of 6.5 to 7.0 are ideal for mulberry. But as mulberry is a hardy crop, it can be grown on any kind of soils ranging from laterite to alluvium provided sufficient water is made available to the fields. The plants are deep-rooted and therefore can extract soil-moisture from depth. The soils do not require extensive soil-water treatment.

However, as has been studied (Roy Choudhri, S. P. (1963) 'Soils of India', pp 45) that N, P, K status should be at certain fixed level, and any deviation from this may result in either an increase or decrease in the metabolic activities of the plants, making them susceptible to insect or fungal attacks. A dose of phosphorus helps the formation of carbohydrates and calcium maintains physiological stability.

Economic Factors

There are a wide range of economic factors, that determine the growth or success of sericulture in any particular region. These are taken into consideration and an attempt has been made to study the influence of these factors on the growth and development of sericulture in West Bengal. Of the economic factors the following are most important :—

- 1) Supply of raw materials, particularly for mulberry culture,
- 2) Availability of labour,
- 3) Facilities for obtaining cheap power or fuel for reeling operations of silk,
- 4) Presence of a good transport network,
- 5) Presence of an organised market for the commodity produced,
- 6) Profitability of sericulture compared to other food and cash crop production,
- 7) Availability of capital to carry out sericulture operations on a commercial scale.

1) **Raw Materials** : Supply of raw material is vital for the development of industry. In this context, supply of good quality mulberry leaf and disease-free layings are extremely important. If the quality of mulberry leaf is inferior, the cocoons are of inferior quality thereby producing inferior grade of thread. Therefore, not only the quantity of leaves but the quality should also be maintained. Most of the silkworm rearers of this State have their own mulberry fields, but during crop failure, the leaves are to be purchased from out-side. Mulberry cuttings are usually supplied to the cultivators by the government nurseries in every mulberry producing districts of the State. The Central Sericulture Research Station at Berhampore is carrying various experiments on evolving new strains of mulberry seeds like C 776, S 642, S 799, S 1301 and S 1531. These improved strains give higher yield over the indigenous varieties by about 60-70 per cent. These improved varieties are now supplied to the sericulturists in the State.

It has also been found that mulberry responds well to irrigated water and nitrogen (Vide Table 3.1).

Table 3.1

Average yield of mulberry leaves/ha in West Bengal, 1979

Mode of culture	Average yield rate kg/ha	Percentage increase of production
Unirrigated	12,400	—
Irrigation every 15 days	15,200	22.4
Irrigation once in a month	13,500	8.9

(Source : Central Sericulture Nursery, Berhampore).

Application of irrigation water at an interval of 2 weeks, increases the yield of mulberry. The sericulturists of West Bengal, both in the plains as well as in the hills, however, do not get usually the facility of irrigation water. But for winter harvest, irrigation is essential, otherwise the production decreases. Winter is also the ideal season for rearing. Therefore, if the supply of leaf is to be maintained throughout the year, irrigation facilities seem imperative. As such, the rearers of the State are often confronted with the problem of shortage of good quality leaves. Another important factor is the supply of disease-free eggs. Unless the eggs are healthy, the yield of cocoon is likely to remain low. At present, the government of West Bengal has made storage arrangements for the preservation of disease-free

layings so that these can be supplied to the sericulturists in the villages. At Kalimpong, a seed station has been established, with a view to preserving and multiplying foreign races of worms. The Central Sericulture Research Station, has also taken up experiments on hybridisation. The Government Nursery and Grainage Farm at Malda also is now trying to evolve a new hybrid variety of worm which will yield more silk thread. The hybrid varieties of eggs are now supplied to the rearers.

2) Labour : The availability of cheap labour is one of the pre-requisites for the industry. Since sericulture is entirely a cottage based industry, it is best suited for an agrarian economic structure. This explains one of the reasons for its heavy concentration in Malda and Murshidabad region which happens to be the major prosperous agricultural regions of the State. A large number of seasonally employed agricultural labourers or cultivators are available for sericulture. It is of interest to note that female labour participation in this industry is high in West Bengal. In this economy, the entire family is involved. Therefore, sericulture offers an additional source of income because of its labour-intensive nature.

However, it must be mentioned that as rearing of silkworm is a highly specialised job, it requires certain amount of skill. The art of rearing is indigenous in Bengal and it is an age-old practice. These are the reasons for the continued survival of sericulture in the regional economy of the State, despite the periods of adversity or prosperity faced by this economy.

3) Power : The mechanical reeling operations need cheap power. In West Bengal, the reeling sector, however, remains unscientific and disorganised. There is only one filature unit in this State, viz., at Madhughat in Malda district which is operated by power. Besides, there are several reeling units at Jalalpur in Malda district, where reeling operations are carried on improved basins (i.e., Ghosh machines and Ray machines).

There are some organisations operated by registered bodies and Khadi Commission, at Malda, Murshidabad, Birbhum and Bankura districts where reeling is carried on improved basins. By and large reeling operations in the State are carried on cottage basins by the reelers in the villages. In the latter case, domestic fuel is utilised. Therefore the availability of cheap fuel is essential for sericulture in the rural areas. The reeling sector requires a large-scale modernisation for which availability of power is essential. But in view of the present power crisis that has gripped the entire country, supply of power appears to be a costly proposition.

4) Transport : The presence of a good transport network is a vital

pre-requisite for expansion and development of any industry, and more so in case of sericulture because of its spatial disintegration. One of the characteristics of sericulture in West Bengal is that the individual sectors like rearing, reeling, weaving and manufacturing are scattered in space. Therefore, transport is the only link through which the different sectors are integrated. The supply of high-yielding variety of mulberry and seed cocoons are from northern hills and plains of West Bengal. Efficient transport system is, therefore, necessary for the supply of mulberry leaves to the cocoon rearers in fresh state. Subsequently, the cocoons need to be carried to the reeling centres and finally to the market. The commercial rearing and reeling operations are mainly concentrated at Malda, from where the reeled yarn is supplied to the weavers of different centres scattered in Murshidabad, Bishnupur, Bankura and Birbhum districts. Finished fabrics are then sent to selected centres like Serampore and Calcutta for dyeing and printing. The printed sarees and other categories of silk fabrics are ultimately produced for the market. These products are meant for the consumers of the State, as well as for other centres of India and overseas.

5) **Market** : As there is no organised market in West Bengal, the sericulturists have to face difficulties in the marketing of their products. The entire business initiating from mulberry cultivation to silkworm rearing and production of silk fabrics are carried in open market. This is primarily a buyer's market and hence the control of middlemen is total. In a mixed rural economy, large-scale exploitation by the money-lending class is quite common. As a result a two-tier and even a three-tier transaction systems are in operation, thereby depriving the primary producers of their fair share of produce. Such practice can be minimised by providing raw-materials (i.e., cocoons and yarn) to the primary producers (i.e., reelers and weavers) and ensuring the disposal of the finished fabrics through government agencies, co-operative societies, Khadi Commission etc. In recent years, the artisans and weavers working within registered bodies have escaped from the clutches of money-lenders.

Since sericulture is a rural cottage industry, the sericulturists with little contact with the market, have to expose themselves to all kinds of exploitation by the traders. The organised sectors, however, cover only 30% of the total industry and bulk of the remaining 70% are in the hands of private sector. Furthermore, as the products are mostly consumed in urban areas, the industry is highly susceptible to market demand. The products are also exported. So, any change in international demand determines the

price of the finished fabrics. Therefore, the industry needs market protection.

There is a good demand of silk fabrics both at home and abroad. The products because of their good texture, strength and durability can compete well with synthetic fabrics. The domestic demand depends on State and national policies, while the international demand depends on the production of quality fabrics at a competitive price and diversification of production lines. The international demand fluctuates widely, depending on the change in the international political, economic and social environment.

6) Sericulture in Relation to other Crops : Mulberry cultivation and associated sectors of sericulture should accrue enough profit compared to other cash or field crops of the area. Cultivation of mulberry is found to be more profitable than sugarcane, jute, tobacco, turmeric and chillies. A survey conducted by the Gramin Bank in Malda District in 1977 reveals that the net cash return from a rainfed field is estimated as Rs. 5,000/- per hectare, as against Rs.2,000/- for jute, paddy and pulses, Rs.2,700/- from pulses, paddy and mustard, Rs.4,000/- for sugarcane. Of these crops, sugarcane cultivation needs use of the land for more than a year while mulberry takes only 4-5 months' time to reap the harvest. It has also been found that an investment of about Rs.2,000/- per hectare of rainfed mulberry land, can realise a net income of Rs.5,000/- to Rs.8,000/- per annum, whereas in the irrigated mulberry plantations, an annual investment of Rs.10,000 may accrue an additional income of Rs.12,000 to Rs 15,000*.

7) Capital : Availability of capital is an important pre-requisite, particularly in case of mulberry sericulture as it requires a fairly large sum of investment during the initial stage of production. However, under the existing economic conditions of the villagers, supply of capital remains poor. The cultivators are mostly small and marginal farmers who can spare little capital for investment in the mulberry sector. Therefore the majority of the rearers of silkworm are dependent on money-lender from generations, although, there are a good number of wealthy rearers in Malda. Similarly, the reelers as well as weavers are traditional village craftsmen/artisans who earn their living from reeling and weaving clothes. Quite often these artisan classes do not possess any land and are left with little surplus to carry out the necessary weaving operations independently. Moreover, the highly specialised nature of a luxury commodity like silk requires particular

* (Source : Government of West Bengal, Directorate of Sericulture and Silk Weaving, 1979).

information on design and fashion. This cannot be achieved by the isolated weavers of the rural areas. Therefore they are still more dependent on the master weavers and traders for final marketing of the woven fabrics who are knowledgeable in this field. The capital market on the other hand is a seller's market, hence the growers are at a disadvantage. But both the markets are interlinked. All these factors have given rise to a very unique feature in the production of handloom materials and consequently the mode of operation in this sector is distinguished from others. This sector falls within the preliminary stages of capitalist production where the weaving operations are carried out by two methods, one being '**putting out system**' where the weavers work in his own home at piece rates on materials put out by and belonging to the merchant capitalist and the second being '**finance and order system**' where the merchant capitalists employ several thousand families by giving them cash advance in return for an agreement to sell their products exclusively to them. This advance is paid without interest, allowing the worker freedom to buy raw materials and have his own or his employees wages.

Both these systems continue to exist in West Bengal. The mode of sericulture production at various sectors falls within the category of **dependency** phase of capitalist production where the cultivators-rearers and reelers-weavers become financially dependent on the merchant capitalists who have a total control of the market.

In rural areas a double monopoly market exists since the time of East India Company. They have implanted the seeds of market imperfections through their '**agency system**' which is being continued till to-day. Presently, market is operated in the following ways : First, mulberry growers and silkworm rearers sell their products to a buyer's market. The buyers have the advantage over several sellers. Secondly, in case of capital and labour market too, the producers are at a disadvantage. They have to borrow money/capital on the one hand and at the same time when necessary they offer themselves as daily-wage labourers to the same set of merchants. Therefore, the capitalist merchants become both the owners of capital as well as buyers of the products. Thus due to market imperfections, in this way, the control of the middlemen on sericulture becomes total.

Socio-Cultural Attributes

Social factors also play dominant role in the growth and development of sericulture in West Bengal. These factors may be institutional, or may be related to caste, land tenure system etc.

1) **Institutional Factors** : This acts as the chief constraint for growth

and development, particularly in the rural areas. Here the villagers are reluctant to accept the new device like the introduction of better strains of mulberry leaf or rearing of bivoltine cocoon instead of nistari varieties, application of chemical fertiliser etc. These devices are capital intensive and profit margin is not appreciably high compared to the traditional varieties. In some non-traditional areas, like some places of Bankura and Birbhum district, an apparent resistance within the local people to the introduction of new technology like introduction of a new strain of mulberry leaf, rearing of bi-voltine cocoon instead of indigenous 'nistari' etc. has been observed. Such a resistance has its genesis in the high input and better care needed in the improved technology and a relatively less return due to the presence of a monopolistic market structure. As such, in many occasions the shy behaviour of the farmers to modern innovations is justified. In non-traditional areas of silk culture, the institutional factors act in a different way from the traditional areas. In both the areas market conditions continue to be imperfect. In non-traditional areas like in case of southern Birbhum where sericulture has been recently introduced with government subsidies, bi-voltine cocoons are usually raised. But these superior grade cocoons are usually sold at a much lower rate as the local market is controlled by traders. As a result, the farmers have now become rather reluctant to adopt mulberry culture and silkworm rearing as subsidiary occupations. They have doubts about the profitability of sericulture. In the traditional areas on the other hand, sericulture continues to survive despite market imperfections, because of historical momentum and specialisation.

2) Castes or Tribes : This factor also determines the nature of sericultural practices. Some of the castes or tribes have acquired specialisation in either reeling or weaving. This explains the regional concentration of different components of sericulture in different regions. For example regional concentration of Pundro-Khatriya and allied castes at Kaliachak in Malda District has led to the concentration of reeling activity in that region. Weaving is similarly localised at Bishnupur and Sonamukhi in Bankura, Baswa and Tantipara in Birbhum and Chak areas of Murshidabad. Incidentally there is a heavy concentration of weaving caste ('Tanti') in these regions. Likewise rearing of eri cocoons is confined within the "Mech" communities of Cooch-Bihar and Jalpaiguri districts. Tasar rearing is carried on by the Santhals and other tribal groups of Bankura, Purulia and Birbhum. These castes and tribes have acquired specialisation through ages and presently have become rather reluctant to impart their techniques of rearing, reeling and weaving to others belonging to other castes or tribal groups.

3) Land Tenure System : The land tenure system is not of particular importance in mulberry cultivation in West Bengal. Most of the mulberry cultivators of West Bengal have their own land. In Malda and Murshidabad districts, the sericulturists own their mulberry land. Only a handful of them do not possess any land. So they have to buy mulberry leaves for rearing purposes from others. In Bankura district, however, some farmers raise mulberry on the fallow lands owned by the Forest Department. This involves an element of risk, because the land might be taken by the forest authorities any time.

In the non-traditional regions of North Bengal, the State Government is providing land to the sericulturists for mulberry cultivation on a lease basis. Therefore in Darjeeling, Jalpaiguri, Cooch-Bihar and West Dinajpur districts, there is no question of tenancy.

Economic Constraints

Sericulture in West Bengal so far has remained in a highly disorganised and disintegrated state both spatially and sectorally. There is no functional linkage between rearing, reeling and weaving sectors. In the absence of a good communication system and an organised market, the sectoral transactions become hazardous — both from physical and economic stand-points. Imperfect market conditions at each stage of silk processing are responsible for the present disorganised condition of sericulture. As a result the intermediaries and traders take full advantage of the system. Each sector of the industry because of its specialisation and linkage with particular section of people is localised in selected areas. Such linkages are difficult to uproot and is economically desirable. For example, rearing and reeling at Kaliachak, weaving at Chak-Islampur, Bishnupur, Bankura, and Baswa-Tantipara have become particularly important since a long period. The socio-cultural and economic factors of localisation have taken a deep root and therefore spatial integration cannot be expected in the near future. In view of this, the Government of West Bengal along with some philanthropic organisations, have taken up several integrated projects in recent years. In these new areas the spatial and functional integration of various sericulture operations have been emphasised. Example of such projects is Ambari-Falakata in Jalpaiguri and Matigara in Siliguri etc. At present market imperfections are acting as detrimental forces to its complete adoption.

Regional Variations in Sericulture and Silk-Weaving

Depending on the various interplay of physical, economic and social factors, eight major regions and four minor regions can be deciphered in

West Bengal each of which has attained a pattern of specialisation in sericulture and silk-weaving. The analysis of growth and development of sericulture will remain incomplete without taking into account of these regional variations.

The regions with their individual characteristics are discussed below. Apparently the various methods of cultivation, rearing, reeling and weaving are same but according to local variations of climate there are variations in mulberry and silk-worm species within the different regions.

1) **Ganga-Mahananda Doab** : Here the heat resistant indigenous, multivoltine nistari worm is reared. They are nurtured on mulberry leaf of *Morus indica* variety of both bush and high-bush form. In winter months bi-voltine worms are reared.

2) **Murshidabad and its Neighbourhood** : This region specialises in weaving which also has a distinctive regional pattern both in the method of weaving and in the nature of fabrics produced. Here weaving is carried on in pit looms and the fabric produced include matka, garod, korial, various dress materials, scarves and stoles.

3) **Nalhati-Bolpur Region** : The region has a long tradition in weaving of non-mulberry (tasar) and mulberry silk fabrics and is also characterised by rearing and reeling activities.

4) **Taldangra-Bishnupur Region** : This region is characterised by mulberry and non-mulberry sericulture with special emphasis on weaving of various categories of fabrics. Weaving is done in Jacquard looms and the famous 'baluchari sarrees' are produced here. Here tasar culture predominates over mulberry culture and the former has a bright prospect because of its forest resources and tribal population.

5) **West Dinajpur Region** : This is essentially mulberry producing region where the methods of mulberry culture and silkworm rearing are more or less similar to that of Malda.

6) **Darjeeling Hills** : Here exotic Kosen variety mulberry leaf is cultivated along with *Morus abla* both in bush and tree form and high yielding bivoltine silkworm is reared. The region because of its favourable ecological environment holds greater prospect for the growth and development of sericulture.

7) **The Terai and Duars Plain** : This region is predominantly a non-mulberry area where eri-culture is in vogue from a very long time. In recent years with government assistance sericulture is being introduced and several pilot projects have been undertaken. Eri-culture is on the decline

because of non-availability of eri cocoons and depletion of tribal population, who have special skill in the same.

8) **Purulia-Raghunathpur Region** : The region specialises exclusively in the weaving of tasar fabrics of various categories. Rearing and reeling are also carried here. Other regions holding promise are :—

- a) Debra-Jhargram area having prospects of mulberry and tasar culture.
- b) Ranaghat area (in Nadia) with ideal ecological environment for silk-worm rearing and mulberry culture.
- c) Barasat area (24-Parganas) having an identical prospects in sericulture, being a continuation of the former area.
- d) Burdwan-Katwa noted for its decaying sericultural practices, though famous in earlier days.

Greater emphasis is now given on the growth and development of sericulture in the drought prone areas of Bankura, Birbhum, Purulia, Midnapur districts and also in the non-traditional regions of North Bengal.

Comparative Advantages of Sericulture in Different Ecological Areas of West Bengal.

A detailed investigation of the comparative advantage of geo-economic determinants of sericulture reveals that 11 out of 16 districts of West Bengal are suitable for sericulture, both for the culture of mulberry as well as non-mulberry based silkworms and preparation of fabrics from it. But production of silk fabrics is much less here. Inadequate co-ordination facilities between the vertical sectors of production and a retarded areal expansion of mulberry lands may be considered as the major contributory factors for such backwardness. Due to high man/land ratio, there is a paucity of agricultural lands in West Bengal. As such the marginal and fallow lands only can be brought within the purview of mulberry cultivation. This keeps down the production of mulberry leaves. Moreover, such introduction of mulberry farming on marginal lands requires technological and institutional inputs which are capital intensive. Therefore, it is difficult to motivate the farmers in such occupations on a large scale.

To overcome this constraint, recently the State Government along with a few philanthropic organisations like Lutheran World Service (LWS), have undertaken special extension and development programmes for the revival and strengthening of sericulture in this state. Several integrated projects have been taken up and sericulture has been gradually expanding in hitherto unknown areas of the northern and western districts from its original nucleus

at Malda. In some places the traditional pattern of production has been largely retained, with the integration of specialised activities, depending on the suitability of that region. In most cases, the sericulture units have become commercially viable. Sericulture is now providing direct and indirect employment to about 300,000 people in the State, most of whom are in rural areas. The State also earns about Rs. 14 million worth of foreign exchange for the country in a year by the export of its various products. Recent experiments also reveal that the non-mulberry sector of sericulture also holds good promise in West Bengal. If properly developed, this can also ensure a better standard of living of a large number of tribal population presently living below poverty line. Therefore, in the context of socio-economic uplift of the backward classes, sericulture holds immense possibilities. With a view to achieving this objective, the main thrust should be exerted to minimise the inter-regional as well as inter-sectoral and intra-sectoral disparities in the field of silk production in the State.

The introduction of integrated sericulture through co-operatives and other institutions and at the same time encouragement of inter-regional migration of sericulturists are some of the measures adopted by the authorities, to fulfill above-mentioned objectives. However, it may be added that the success of such efforts will depend largely on their proper implementation.

CHAPTER IV

PATTERNS OF SPATIAL DISTRIBUTION

The micro regional differences of bio-ecological, socio-cultural and economic factors have given rise to a hierarchic pattern in spatial distribution of sericulture regions in West Bengal. Each regional unit can be distinguished for its unique set-up in production, distribution and marketing functions of multi-sectoral stages of sericultural processing system. Apparently the micro functions of cultivation-rearing, reeling and weaving are same but according to local variations of terrain-soil- climate, there are variations in mulberry and silkworm species within the different regions. The entire State has thus been divided into eight major regions and four minor regions each of which has attained a pattern of regional specialisation in sericulture and silk weaving.

Zones of Concentration : Major Regions

The sericulture units of the State depending both on mulberry and non-mulberry host plants are concentrated in 8 broad regions, viz.,

- (a) Ganga-Mahananda Doab.
- (b) Murshidabad and its neighbourhood.
- (c) Nalhati-Bolpur.
- (d) Taldangra-Bishnupur.
- (e) West Dinajpur
- (f) Darjeeling Hills
- (g) Piedmont plains of the Terai and Duars.
- (h) Purulia-Raghunathpur.

Besides these, there are several other isolated viable centres for further development such as :-

- i) Debra-Jhargram area
 - ii) Ranaghat and its environs
 - iii) Barasat area in 24-Parganas
 - iv) Burdwan-Katwa area
- (Vide Fig. 3)

Locational Considerations: The locational factors affecting the various sectors of sericulture are three-fold :-

- 1) Healthy environment for silkworm growth
- 2) Necessary ecological conditions for mulberry culture or for the growth of non-mulberry hosts.
- 3) Marketing and transport facilities in the manufacturing centre.

On the basis of these factors the areas of high, medium and low concentration of sericulture have been identified in space and interplay of the above-mentioned factors have been analysed. It is generally seen that the first two conditions are favourable in most of the areas of West Bengal. As such the marketing and transport network are the major determinants in the regional concentration of sericulture in the State (Vide Fig. 4). However, there exists a positive relationship between the ecological and economic factors in the spatial distribution of sericulture in this State (Vide Table 4.1 and 4.2).

Table 4.1
Location determinants of sericulture in West Bengal

Regions	Ecological Factors				
	Terrain	Soils	Rainfall (mm)	Temperature °C	Humidity (%)
1.	2	3	4	5	6
A. Ganga-Mahananda Doab	Elevated Tract	Sandy loam	1,430	17-30	68
B. Murshidabad and its neighbourhood	ET	Loam and clay loam	1,390	19-31	80
C. Nalhati-Bolpur	ET	Sandy, clay loam and clay loam with concretions	1,420	21-32	66
D. Taldangra-Bishnupur	ET	Laterite mixed with Kankar	1,320	20-32	67
E. West Dinajpur	ET	Loam and clay loam	1,835	17-30	71

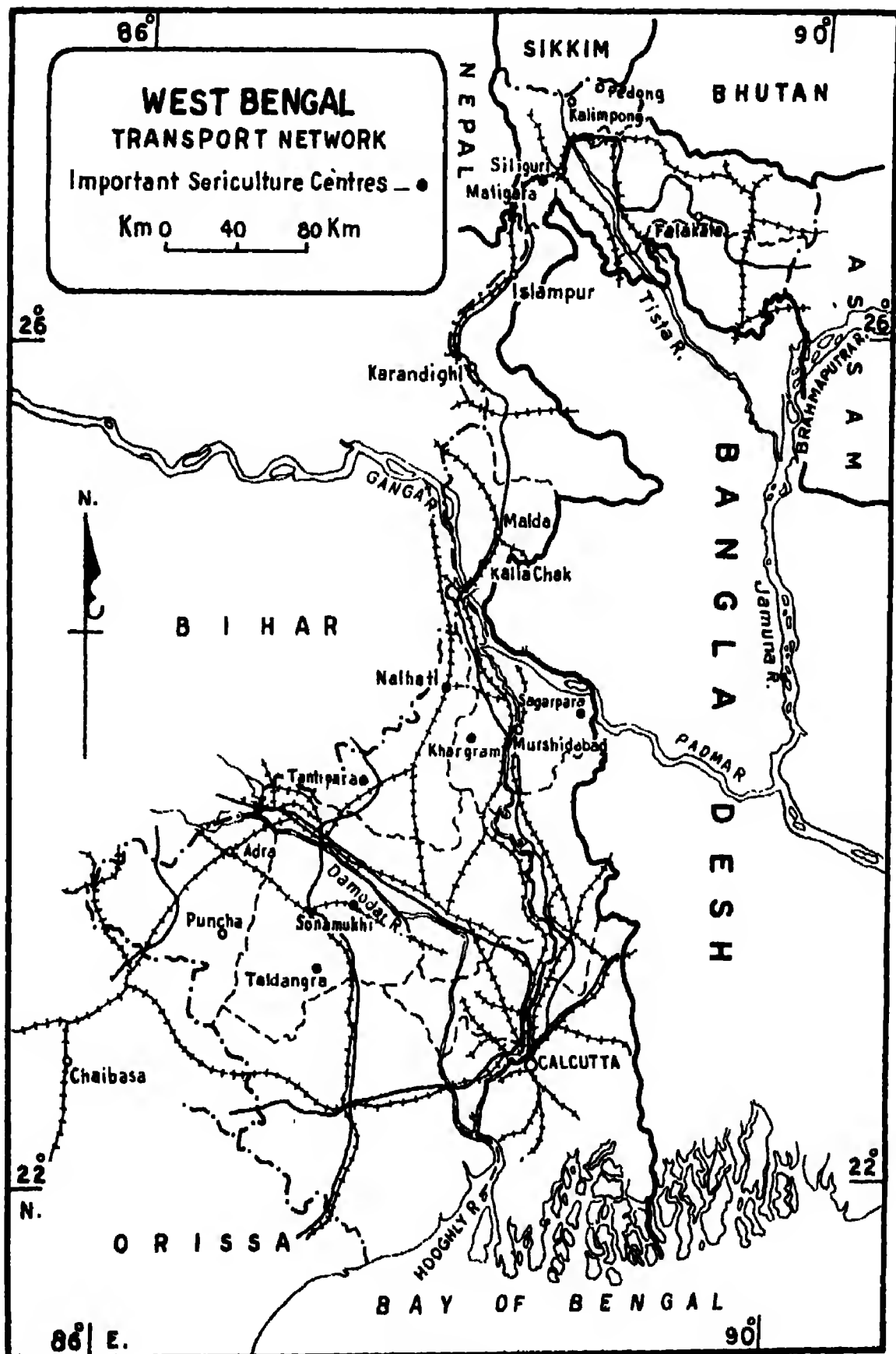


Fig. 4

Table 4.1 Contd.

1	2	3	4	5	6
F. Darjeeling Hills	Hill slope	Sandy and clay loam	2,306	11-22	82
G. Piedmont Plains of the Terai and Duars		Sandy and clay loam	3,267	17-28	75
H. Purulia-Raghunathpur		Laterite, sandy loam and sand	1,310	21-32	58

ET - Elevated tract generally 1-2 m. above the surrounding areas.

Table 4.2

Regions	Economic Factors		
	Labour	Transport	Market
1	2	3	4
A. Ganga-Mahananda Doab	Skilled labour (Rearing and Reeling)	Railway (N.F.R.) NH	Malda and Calcutta
B. Murshidabad and its neighbourhood	Skilled artisan	Railway (E.R.)	Malda and Calcutta
C. Nalhati-Bolpur	Skilled artisan	Railway (E.R.)	Malda and Calcutta
D. Taldangra-Bishnupur	Skilled artisan and tribal population	Railway (N.F.R.) NH	Malda and Calcutta
E. West Dinajpur	Agricultural labour, Displaced persons	Railway (N.F.R.) NH	Siliguri and Malda

Table 4.2 (Contd. . .)

1	2	3	4
F. Darjeeling Hills	Seasonal agricultural labour	NH, No Railway line	Siliguri and Malda
G. Piedmont Plains of the Terai and Duars	Agricultural labour and tribal population	Railway (N.F.R.)	Siliguri and Malda
H. Purulia-Raghunathpur	Tribal population and artisan	NH Railway (S.E.R.)	Calcutta

Table 4.3

Transport Matrix (Inter and Intra Regional)

Regions	Distance of regions in Km (Road and Railways)								Total	Grade Index
	A	B	C	D	E	F	G	H		
A	0	100	150	350	130	380	330	260	1700	1
B	100	0	120	310	250	460	430	220	1890	1
C	150	120	0	220	330	470	550	100	1940	5
D	350	310	220	0	470	570	360	80	2360	2
E	130	250	330	470	0	250	210	490	2130	1
F	380	460	470	570	250	0	150	570	2850	3
G	330	430	550	360	210	150	0	720	2750	3
H	260	220	100	80	490	570	720	0	2440	2
Total	1770	1890	1940	2360	2130	2850	2750	2440		

Note : The added values have been grouped in the following way:

- Group 1 1700-2200
 2 2200-2700
 3 2700-3200
 4 3200-3700
 5 Above 3700

Table 4.4

Distance from raw material source and market of silk producing regions in West Bengal

Silk Producing Regions	Distance from (Km)				
	Malda/Chaibasa (Raw material source)		Grade Index	Calcutta market	Grade Index
A. Kaliachak	25		1	310	2
B. Sagarpara	180	300	2	190	1
Khargram	120				
C. Tantipara	180	290	2	190	1
Nalhati	110				
D. Taldangra	280	540	5	150	1
Sonamukhi	260				
E. Islampur	170	280	2	350	2
Karandighi	110				
F. Kalimpong	280	590	5	550	4
Pedong	310				
G. Falakata	320	550	5	640	5
Matigara	230				
H. Adra	290	600	5	330	2
Puncha	310				

Note : The added values of two columns have been grouped in the following way : -

Group	1st Column	2nd Column
1	< 200	150-250
2	200-300	250-350
3	300-400	350-450
4	400-500	450-550
5	500-600	550-650

Table 4.5

Composite index of transport efficiency in the sericultural units of West Bengal

Regions			Total Grade Value
	Table 3	Table 4	
A	1	1 2	4
B	1	2 1	4
C	1	2 1	4
D	2	5 1	8
E	1	2 2	5
F	3	5 4	12
G	3	5 5	13
H	2	5 2	9

Note: On the basis of the grade values, an accessibility range has been determined.

Most accessible	Group 1	4 - 7	A,B,C,E
Moderately accessible	Group 2	7 - 10	D,H
Least accessible	Group 3	10 - 13	F,G

Therefore Ganga-Mahananda Doab, Murshidabad and its neighbourhood, Nalhati-Bolpur and West Dinajpur are most accessible followed by Taldangra-Bishnupur and Purulia-Raghunathpur which are moderately accessible. The least accessible areas are Darjeeling Hills and Piedmont Plains of Terai and Duars. It becomes apparent from the Tables (Vide Tables 4.1 - 4.5) that ecological conditions are congenial for sericulture in almost all the 8 regions mentioned above, with the exception of Taldangra-Bishnupur and Purulia- Raghunathpur where the soils are poor and climate is drought prone. In these two regions tasar culture as well as weaving of tasar fabrics have flourished in place of mulberry silk. With the help of additional technological inputs, mulberry culture might possibly be introduced in these regions as well. It may also be observed that infra-structural facilities have been helpful in the prosperity of sericulture in the first two regions, particularly because of favourable transport, market and labour.

As it stands, the zones of high concentration still lies in the *Ganga-Mahananda Doab and Murshidabad and its neighbourhood areas.*

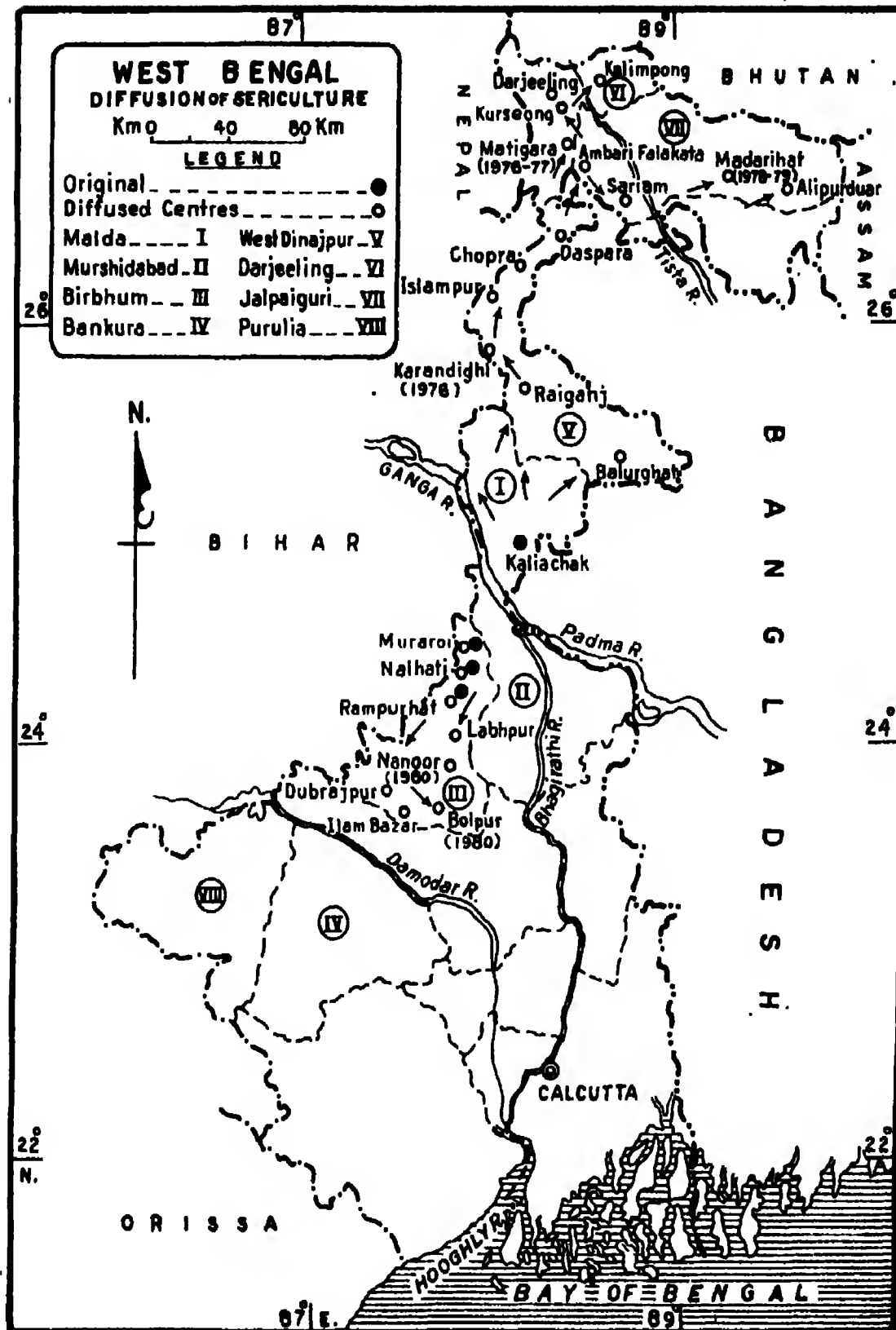


Fig. 5

The zones of medium concentration are at *Nallhati-Bolpur, Taldanga-Bishnupur and Purulia-Raghunathpur* regions.

The areas of low concentration are located at West Dinajpur, Darjeeling Hills and Piedmont Regions of the north (Vide Fig.5).

Ganga-Mahananda Doab

The region covers a major part of Malda district. About 67% of the total mulberry area of the State is concentrated here. Besides mulberry farming, the region is also famous in silkworm rearing and reeling of silk yarn. In 1985, the region claimed to have 6,530 ha of mulberry farms. The output of the leaves helped in the rearing of about 4.4 million Kg. of cocoons. The region has an average outturn of 350,000Kg. of silk yarns.

The region enjoys ideal ecological and infra-structural facilities for the growth and propagation of sericulture. The transport network is most efficient and with the completion of the Farakka Thermal Power Plant, the cottage sector will have additional viability in the growth of a few ancillary industries over the main silk industry. The labour efficiency is high both in farming sector as well as in rearing of silk worms. Excellent accessibility with the markets of North Bengal and Calcutta is a positive advantage of the region. The weaving sector may be better developed here through the introduction of powerlooms. At present, this sector feels neglected and with some incentives the sector can be revitalised.

Murshidabad and its Neighbourhood

This region comes second to Malda in importance. In weaving silk fabrics, the region ranks first in West Bengal. Recently rearing of cocoons and reeling of silk-yarns are also being introduced along with the weaving sector. This is the ideal region for the purpose of integrating agricultural and manufacturing operations in sericulture in the State. Because of such advantages, the Central Sericulture Research Station, the only one of its kind in the State, has been set up here. Incidentally it may be noted that future growth of sericulture in West Bengal, largely depends on our ability to integrate the farming sector with the manufacturing sector. Therefore, future viability of the region will depend on its success in mulberry cultivation and cocoon rearing. In 1988, the mulberry land of the region covers an area of about 2,130 ha. The average outturn of cocoons has been estimated as 4,300,000 kg. About 70% of the cocoon production of this region are sent to Malda for the reeling purposes. The yarns are again brought back for weaving. The cost of transport can be curtailed if reeling operations can also be performed in this region.

Nalhati-Bolpur Region

This region comes third amongst the sericultural regions of the State. Mulberry is cultivated on about 1,800 ha. of land. The annual outturn of cocoons is about 6,300,000 kg. This region is noted for both mulberry and non-mulberry silk culture. It is interesting to note that none of them has been able to exert supremacy over the other in the total production of silk fabrics. The percentage of mulberry land to the net sown area is negligible, viz., 6.73%. Likewise the forest area covers only 2.74% of the total land area. The region claims only 11% of the total mulberry area of the State.

This region is traditionally famous for tasar weaving and had been an important tasar weaving centre since the pre-independence days. Therefore further development of weaving sector could be a viable proposition. The future development strategy of the region depends on careful investigation of economic and ecological factors. But before the strategy is determined, one has to think over the following questions. Whether it is desirable to develop both mulberry and non-mulberry sectors through production diversity and blending of the fabrics, or whether the mulberry silk sector should be stressed over the tasar. Under the present circumstances it is doubtful whether the region will be able to compete in mulberry production over the other two regions in view of the fact that the other two regions enjoy better ecological and other advantages in the production of mulberry silk.

Taldangra-Bishnupur Region

This region has developed both the mulberry and non-mulberry sectors of sericulture in the State. These two sectors are clearly concentrated in two different parts. The eastern region is noted for mulberry culture whereas the western part specialises in tasar culture. But non-mulberry tasar culture dominates over the mulberry silk in the region. Mulberry plantation is limited to only 340 ha. of land area. The annual outturn of cocoons would be 2,000,000 Kg. The tasar culture is favoured by the growth of host plants in the forests which cover about 125,000 ha. of land area of the region. The area under tasar plantation has also increased during 1987-88 which is about 116 ha and the estimated tasar cocoon production would come to about 150,000 Kg. Therefore this region possesses viability in tasar culture. At present, this sector is highly disorganised and suffers from raw material shortage. To overcome these constraints, identification of tasar host plants has been undertaken and land has been acquired from Forest Department where block plantation has recently been introduced. This will not only help the tasar silkworm rearers but will encourage

afforestation. Growth of silk industry in this region is facilitated by its location in close proximity to two market centres namely, Durgapur-Asansol in the north and Hatia- Jamshedpur industrial belt in the west. Moreover, the region enjoys the facility of regular supply of skilled labour-artisans, moderately accessible transport network and market.

West Dinajpur Region

West Dinajpur is the foremost among the non-traditional areas of sericulture. Mulberry cultivation has recently been introduced in this area which now covers about 1,100 ha. of land. Silk-worm rearing is also being carried on mulberry leaves.

Sericulture was first initiated in the region after the First Five Year Plan on government initiative. The fallow lands of the district, not otherwise suitable for traditional crops like rice, have been brought under mulberry. The environment is favourable for mulberry farming. There is a surplus labour supply from Malda and Siliguri areas which is a source of cheap labour to farming and existing rearing sector. The main constraint is its inaccessibility and distance from existing market centres. However, the region is located near Jalpaiguri-Siliguri cotton belt, where cotton weaving is developed. Moreover, Siliguri- Darjeeling has a well-developed urban tourism complex, wherein lies a potential market. This factor alone can provide sufficient incentive for the creation of necessary infra- structural facilities in the region. The region can then be a viable area for an integrated development. As it stands, the region grows mulberry on which cocoons are reared. During the last 20 years, production has increased which is now sent to Malda. Some of the cocoons are preserved as seeds and sent to other centres. Given a little training in reeling and weaving, sericulture can be successfully introduced here much to the benefit of the people. Moreover, reeled silk can be despatched to Jalpaiguri-Siliguri areas for weaving which are noted for handloom weaving in North Bengal.

Darjeeling Hills

Mulberry culture of the region is usually concentrated in Kalimpong sub-division. The mulberry area covering about 400 ha. is concentrated at Kalimpong and Pedong. Quality bi-voltine varieties of cocoons are reared here; annual production of which is well over 80,000 Kg. This region plays a vital role in the development of sericulture in the State because of its ideal environment for the culture of exotic varieties of mulberry and rearing of bi-voltine silkworm. This is the second important non-traditional area of sericulture in the State, supplying disease- free laying to all other major centres. However, the other infra- structural facilities are not congenial in

the region. For example, transport in the hilly terrain is difficult and labour is not well organised. The market lies at a distance. Presently labour is brought from Malda or local labours are trained through technical assistance. However, Kalimpong continues to be excellent raw-material base of quality cocoons for other regions.

Most unfortunately, during the last three years of GNLF agitation the sericulture production sector of the entire hill region has suffered a tremendous loss, amounting to about Rs. 2 to 3 crores. Almost all the production units of Kalimpong, Takdah, Bijonbari etc. have been burnt down. Therefore, the government of West Bengal has selected a new region namely Jhalda in Purulia where a new hybrid variety of silk worm has been introduced keeping in view the local bio-ecological conditions. Experts are of the opinion that this new region will be able to supply the requirement of the existing reeling units of the State. However, it is to be hoped that with settlement in Darjeeling Hill areas, the political climate will improve and once again the sericulture production will be revived.

Piedmont Plains of the Terai and Duars.

This region is located in Jalpaiguri and Cooch-Bihar districts and partly in Darjeeling district. The region shows a combination of mulberry silk along with non-mulberry eri-culture. The mulberry land covers only an area of 650 ha. of land. Eri-silk culture is specially concentrated around Alipurduar-Kumargram in Jalpaiguri district. The region holds excellent promise for the development of eri silk. At present, production of eri eggs is well over 7 Kg. More than 1,140 persons are presently employed in silkworm rearing in the region.

In Cooch-Bihar district eri-culture is, however, on the decline. The main constraint is non-availability of eri eggs and reeling facilities. Other infra-structural facilities are less developed compared to other regions discussed above. The transport accessibility is poor. Under the government initiative, however, the industry is gradually showing signs of improvement. A few integrated projects have recently been taken up. Future success of sericulture of the region will largely depend on the establishment of transport-market linkage between the other two regions of sericulture in the North Bengal.

Purulia-Raghunathpur Region

This region has exclusively specialised in tasar culture and plays an important role in the tribal economy of the region. Mulberry cultivation has only been tried in recent years. In fact, about 5 ha. of land are put under mulberry. Since then sericulture activity has been expedited in the

region and as a measure about 105 ha. of land has been brought under mulberry cultivation. The annual outturn of cocoon during 1988-89 has been estimated at 800,000 kg. But the abundance of tasar host plants within the abundant forests, has made the region ideal for the rearing of tasar silkworms. Forest lands cover about 630,000 ha. of land covering about 11% of the total area of the district. In the field of non-mulberry sericulture, i.e. tasar too, the region has picked up development. About 120 ha. of land has been brought under tasar host plantation during 1987-88 and about 91 tribals have been benefited by this. A pilot production centre has come up in Kapistha located at Kashipur police station. The average annual production is about 620 Kg. of tasar cocoons. The region is noted for weaving of tasar fabrics. The transport network is moderately developed. The region lies in close proximity to the raw material base of Chaibasa, from where tasar cocoons are supplied. If both the regions could be linked up in respect of raw material supply and exchange of finished fabrics, the regional economy is likely to improve in future.

Minor Regions of Concentration

The minor regions of sericulture in West Bengal are :-

1. Debra-Jharagram area
2. Ranaghat and its environs
3. Barasat area in 24-Parganas
4. Burdwan-Katwa area.

These regions are either a former centre of sericulture (viz., Katwa, Ranaghat, Debra), or have recently been selected for proposed development. Amongst these regions mulberry area is gradually increasing at Ranaghat (about 30 ha.), Barasat is picking up mulberry cultivation for the specific purpose of cocoon rearing. Burdwan-Katwa region records only an insignificant area under mulberry in the State.

Both these regions in Nadia and North 24-Parganas are becoming viable for sericultural activity. As such about 194 ha. in Nadia and 136 ha. in North 24-Parganas have been brought under mulberry cultivation during 1987-88. The estimated production of cocoon during the period is stated to be 1,800,000 Kg.

Debra-Jharagram area of Midnapore district has a long history of mulberry culture particularly in an around Debra. At present, the Government Nursery at Debra supplies the bulk of best quality disease-free silkworm layings to the commercial rearing centres of the State. In Midnapore district about 237 ha. of land has been brought under mulberry

cultivation during 1987-88. About 1,900,000 kg. of cocoon will be produced from the nursery and grainage of Debra and Satyadihi Sericulture Farm of Jhargram during 1988-89. In the surrounding regions of Jhargram, the rich forest wealth and tribal population offer ideal environment for the development of tasar rearing. At present, forest area covers about 32% of the total area at Salboni Police Station, which is the highest in the district, being closely followed by Garbeta, Binpur and Jhargram Police Stations. In Midnapore an additional 158 ha. of land has been brought under host plantation during 1987-88, which will benefit about 60 tribal people.

Garbeta-Jhargram area lies near the tasar belt of Mayurbhanj district of Orissa, where tasar rearing is being accelerated with assistance of the Central Government. If the tasar host plants like Asan and Arjun trees can be systematically planted within the forests of the region, Midnapore region may well become an important raw material base for tasar industry in West Bengal, supplying reeled yarn to the weaving regions of the adjoining districts of Bankura and Purulia, which at the moment suffer from an acute shortage of reeled tasar yarn. This is a very viable proposition because apart from ecological suitability, this region enjoys other infrastructural facilities like good transport, market and supply of skilled artisans for the work.

The entire western part comprising of Taldangra-Bishnupur (Bankura district), Purulia-Raghunathpur (Purulia district) and Jhargram-Gopiballavpur (Midnapore district) could be functionally linked up with Chaibasa-Mayurbhanj areas of Bihar-Orissa. In that case, an integrated tasar sericulture could very well be developed taking into account all the sectors of its production, i.e. plantation, rearing, reeling, weaving, processing of finished fabrics and marketing. This also has good implication on the regional development of the area. The tribal population at present living below the subsistence level, will be benefited by the process. The entire scheme of revitalisation of tasar could be linked up with social forestry programme initiated by the Central Government, with the specific purpose of protecting the endangered forest resources of this country. Future development of sericulture in West Bengal will largely depend on the patterns of growth attempted in the mulberry silk culture carried in the central and northern parts and non-mulberry silk culture in the western plateau of West Bengal. From ecological and socio-economic spectrum, it may be said that the mulberry sector is geo-economically more viable in the Malda-Murshidabad and North Bengal regions while non-mulberry tasar silk will be viable in the western regions. However, future growth of these less developed minor regions will depend on a harmony between the production of mulberry

bushes and non-mulberry host plants for the rearing of cocoons. Side by side, it is necessary to take special care in the rearing of cocoons, diversification of production lines particularly in reeling and weaving of silk products looking after the tastes and demands of the various markets.

Naturally future planning should give emphasis on a integrated development, taking into account the various aspects of production with market need. This requires a close liaison between the agriculture and manufacturing sectors of sericulture in the State.

The Government has plans to set up additional centres in ecologically sound regions. The objective is to cater to the local needs and give additional employment to the people.

From the recent development in both mulberry and tasar sectors, it becomes quite evident that the State government has realised the viability of future sericultural development as suggested and it is hoped that during nineteen nineties also the same trend will be continued. In fact the Government has proposed to create additional economic plantation of tasar host plants in the above mentioned micro-regions. All these will strengthen the raw material base of the non-mulberry sector which needs replenishment.

CHAPTER V

CULTURE OF MULBERRY AND NON-MULBERRY HOST PLANTS AND SILKWORM REARING

Sericulture vis-a-vis Production Characteristics

Sericulture basically being an agro-based industry involves multi-sectoral processing of silkworm rearing, reeling and weaving. It produces farm crop, i.e. mulberry which is directly responsible for producing silk cocoons. Therefore, primary and secondary stages of production are operative in this industry. The actual silk processing i.e. silk reeling involves machine production either in mechanised or semi-mechanised reeling units. This, together with weaving of silk fabrics, both in handloom units and powerloom factories come within the secondary sector of production. The manufacturing of finished products, i.e. silk fabrics are produced after degumming, bleaching, dyeing and printing. These operations come within the tertiary sector of production where most of the workers are casual labourers, working on contract or piece rate basis in small semi-industrial workshops. These small workshops are mostly located near the market centres. Consequently, the location of printing units are influenced by consumption pattern of the commodity. Thus the production phases of sericulture is related to multi-sectoral factor/product components where the laws of primary, secondary and tertiary sectors operate in rural and urban areas.

Thus, silk industry is dependent on the availability of raw material in one hand and existence of ready urban market on the other. As such, the laws of supply and demand at various stages of production affect the location of a particular sector of the industry. This unique kind of production function which acts at differential spatio/sectoral framework makes economic analysis of sericulture rather difficult. As the cost-benefit structure of the factor and product markets in rural and urban areas differ widely, it brings in additional growth constraints, as far as the total development pattern is concerned.

In the following sub-sections the various aspects of culture of mulberry and non-mulberry host plants and silk-worm rearing, economics of production in farming sector, cost structure of mulberry and non-mulberry production, by-products of sericulture etc. have been discussed.

It has already been discussed that sericulture has two distinct sectors - one agricultural and the other manufacturing. Naturally the economics of

production depends on the success in both the sectors. The agricultural sector deals with the production of mulberry leaves for cocoons from systematic cultivation. In non-mulberry sector it is necessary to produce or multiply host plants which can also be fed to other types of silkworms. A sound economy in mulberry and non-mulberry sector of production therefore takes into consideration the cost benefit aspect of farming so as to produce sufficient quantity of healthy leaves which can be fed to the cocoons. It may also be mentioned here that cocoon rearing is generally concentrated near the sources of raw-materials - in this case fresh leaves of mulberry and of other host plants. It is, therefore, common to have rearing of cocoons associated with the farming sector.

The processing sector includes reeling of silk-yarn from cocoons and their subsequent weaving so as to have various products to cater to market demand. This is the manufacturing sector of sericulture and naturally it is expected that laws of industrial location may be applicable in this case. As such reeling and weaving sectors have regional concentration which may be governed by availability of good quality cocoons, skilled labour for silkworm rearing, reeling and weaving, facility of good communication network or the demand in the consuming centres. Unlike the farming sector, the manufacturing sector presents a diverse spatial distribution.

It is, therefore, evident that unlike other branches of production, the economics of production in sericulture is interlinked between the farming as well as the manufacturing sector.

Economics of Production in Farming Sector

Production of mulberry leaves or multiplication of host plants depends on multiple factors, some of them are environmental and some economic. In many cases institutional factors may play a dominant role. Unless the natural environment is congenial, mulberry cultivation is not likely to be profitable both in terms of production as well as quality of leaves.

This is also true for the host plants which are also susceptible to minor changes in climate and soils. This accounts for the regional concentration of mulberry culture in the Ganga-Mahananda Doab and of the host plants in the semi-arid Western Plateau.

The alluvium lands of the Ganga-Mahananda Doab are annually replenished with fertile soils from the flood waters of the Ganga river. This enriches the nitrogen and phosphorus contents in the soil which are helpful for flushing of mulberry leaves. Therefore, additional investment for chemical fertiliser is not necessary. This curtails the overall expenditure on

farming sector.

The sandy loam, with a pH value of 6.8 to 7.0, is ideally suited for farming of good quality mulberry leaves of *Morus indica* variety. Hence Malda records the highest yield of mulberry leaves (36,000 kg. per hectare) in this State.

The other mulberry growing regions do not possess such facility. For example in Murshidabad and Nalhati-Bolpur region, the soil character changes from loams and sandy clays to loams with concretions. The pH value ranges between 5.5 to 6.5. The rainfall gradually decreases to the west. These conditions demand additional irrigation water and soil nourishment for the culture of mulberry. Accordingly, the flushing of leaves decreases (34,500 kg./ha. in Murshidabad and 28,000 Kg./ha. in Birbhum) despite additional capital investment in the farming sector. Thus the cost of production in these regions is somewhat higher than that of Malda (Vide Table 5.1).

Table 5.1

Average annual production of mulberry leaves and cocoons in different regions of West Bengal, 1981

Regions	Production per Kg./ha.	
	Leaf	Cocoons
Malda	36,000	850
Murshidabad	34,500	900
Birbhum	28,000	1,000
State Average	33,000	900

(Source : On the basis of field work conducted by the author in respective regions).

Although the hill region (Darjeeling District) is ecologically more congenial with mild temperature and humidity conditions for the propagation of *Morus alba* variety of mulberry, yet the uneven terrain character necessitates terrace farming, thereby involving higher cost of production. In this case also the cost of production in the farming sector is somewhat higher than Malda.

Therefore it becomes evident that the environment is ideal in Malda for commercial mulberry culture, where leaf yield is higher, quality of leaves better and cost of production is lesser than in any other parts of West Bengal.

Rearing

In rearing operations, the ecological congeniality is even more

susceptible than the cultivation of mulberry leaves. The climate of Malda is suited for *B. craesi* variety of silkworms which can be reared 4 to 5 times in a year for commercial purposes. The cocoon yield is about 850 Kg./ha./annum. The temperature here ranges between 17-30°C, rainfall is about 1,430 mm. and humidity is about 68%. The rearing operations of cocoon in Malda are not particularly benefited from the humid climate. In the western regions, as in Murshidabad and Birbhum districts, climate is dry which is helpful for cocoon rearing. Hence, these regions record higher yield rates (900 Kg./ha./annum and 1,000 Kg./ha./annum respectively) than Malda. Therefore climatically, Malda is not ideal for cocoon rearing although in volume cocoon production is the highest in the region (Vide Table 5.1)

In the other two regions mentioned above, exotic varieties of silkworm races have been introduced with additional capital investment. As such in the latter two regions production cost has become slightly higher in the farming sector. Similarly, in other non-traditional regions of the north, production cost is higher in the farming sector because of the need of additional technological inputs.

As regards to non-mulberry host plants, the absolute ecological range in viable regions, viz., in Bankura, Purulia and Birbhum, a combination of high temperature and low humidity conditions help in bringing down the production cost in the agricultural sector. However, with a view to increasing the present yield rate of tasar cocoons, plantation of host plants and indoor rearing of tasar silkworms have been introduced. Because of all these factors, the laws of economics of production in different sectors of mulberry and non-mulberry sericulture as well as its relation to main cereal crops need careful analysis.

Cost Structure of Mulberry Production : It is difficult to analyse the cost structure of mulberry farming because it varies from place to place and also with different seasons. The wage rate of labourers varies with seasons and the quantum of inputs applied to the field like fertiliser, irrigation etc. may vary with climate, soil and terrain. So naturally cost of production in farming varies. As Malda is noted for its production of mulberry, field studies have been conducted here to give a representative idea of the cost of cultivation as well as the expected return from such farming. Cost has also been analysed in Murshidabad, which occupies a secondary position in mulberry area but enjoys better locational advantages in respect to other sectors of sericultural activities. Analysis has also been made in Birbhum where mulberry has recently been introduced with the

help of irrigation and mulberry is being grown in association with non-mulberry host plants for cocoons. In Malda the study was conducted at Amjamtala village in Englishbazar Police Station which is noted for the culture of cocoon seeds. In Murshidabad and Birbhum, the study was conducted at Balaspur (Nabagram P.S.) and Raipur (Nalhati P.S.) respectively. These villages are noted for commercial rearing of cocoons. On the basis of field work carried in different regions, the cost structure of mulberry farming and cocoon has been estimated. It has been found that the total expenditure in farming and rearing per hectare is about Rs. 19,000/- whereas the return is estimated to be about Rs. 27,000/-, thereby accruing a net profit of Rs. 8,000/- of successful farming and rearing (Vide Table 5.2).

Table 5.2

Cost of mulberry cultivation and cocoon rearing in different regions of West Bengal, 1981

Items	Production per ha/annum		
	Expenditure		Income
	Actual Rs.	% to total	(in Rs.)
A. Farming			
1. Cost of mulberry cuttings/grafts 8,000 kg @ Rs. 16.00 per 100 kg.	1,280	16.16	
2. Cost of labour in mulberry cultivation 300 man days for 4-5 crops @ Rs. 8.00 per labour per day	2,400	30.30	
3. Fertiliser 450 kg. @ Rs. 8.00 per kg.	3,600	45.45	
4. Irrigation charges (2 days of waterings of 10 hrs. duration, i.e., 20 hours of watering per crop in dry season or 80 hrs. per 4 crops in a year @ Rs. 8.00 per hour)	640	8.08	
			Sale value of 33,000 kg. of leaves @ Rs. 1 per 3 kg. Rs. 11,000/-

Rs. 7,920/- 11,000/-
cash income or profit Rs. 3,080/-

Table 5.2 (Contd.)

Item	Production per ha/annum	
	Expenditure	Income
	Actual Rs.	(in Rs.)
B. Rearing		
1. Cost of leaves for rearing (@ 30 Kg. of fresh leaves per Kg. of cocoon' total requirement 900 × 30 Kg. of leaves cost Rs. 10/- 900 Kg. × Rs. 10/-)	9,000	
2. Cost of d.f.l.	100	
3. Cost of labour for rearing 100 d.f.l. 30 man-days @ Rs. 8/- per labour per day	240	Sale value of 900 Kg. of cocoons @ Rs. 18/- per Kg.
4. Cost of disinfectants	100	Rs. 16,200
5. Cost of rearing appliances	2,400	
	Rs. 11,840	16,200
	cash income or profit	Rs. 4,360

From the table it is apparent that mulberry cultivation is on the whole profitable in West Bengal. If mulberry cultivation is integrated with other sectors of production and processing, i.e., rearing, reeling, weaving, dyeing and printing, it becomes more profitable as duplication of the cost in various processes of production can be minimised.

As such in Malda, about 75% of the cultivators are silkworm rearers and therefore they do not purchase leaves for feeding of silkworms, hence a substantial portion of the expenditure is curtailed. But sometimes if the leaf production is insufficient the rearers have to purchase leaves from the exclusive leaf sellers who occupy about 25% of the sericulturists.

As integrated sericulture brings more profit, in non-traditional regions the trend is towards integration of various sectors. Integration in farming and rearing results in higher margin of profit, the total being Rs.6,360, whereas in case of farming it is only Rs.3,080 and in rearing Rs.4,360.

If the composite profit is taken into account it could be mentioned that there is an excess production of 6,000 Kg. of leaves (total requirement 27,000 Kg. of leaves for producing 900 Kg. of cocoons, which is normal for one hectare of land in the State while total production is 33,000 Kg. of

leaves), which can earn a revenue of about Rs.2,000.

From the analysis it further emerges that in the farming sector about 45% of the total expenditure is on fertilisers, followed by labour cost of which comes to about 30%. During the first year labour charge is high which gradually decreases in the following years. But here it must be mentioned that in sericulture sector mostly family labour is involved. In non-traditional areas of sericulture, however, labour cost is high. Irrigation water is applied mostly in the mulberry gardens of non-traditional regions. In the rearing sector about 76% of the total money is spent on buying mulberry leaves. This is true in case of non-traditional regions. However, since majority of the rearers in traditional areas grow mulberry leaves, expenditure on this item is not high in all the sericultural regions of the State. Another major expenditure is on the construction of rearing houses with rearing equipments. In the non-traditional regions this expenditure is subsidised at a government rate of 25% of the total. A bank loan of 50% of the total expenditure is provided to the cocoon rearers.

By-products of Sericulture

The analysis of economics of production in the farming and rearing sectors would remain incomplete, if the by-products of sericulture are not taken into consideration.

The by-products produced at different stages of processing are utilised for various farm operations to cut down the cost of production. The mulberry fruits are used for canning and preservation. The branches of the mulberry trees are used as fuel.

During rearing, the silkworms produce a large quantity of litter which is used as manure after decomposition. Thus the waste products are utilised.

In West Bengal mulberry is cultivated with other food and cash crops. Therefore, a comparative cost structure between rice, the principal food crop, and mulberry has been worked out which will substantiate the fact that mulberry culture is a profitable farm operation, in comparison to rice. This will help the cultivators in propagating mulberry culture in the non-traditional regions (Vide Table 5.3).

A comparison of cost structure of mulberry and rice indicates relatively high profitability of mulberry over rice. This is quite normal because unless the profit margin of mulberry, a cash crop is substantially high over the main cereals (mainly rice), the farmers will not be interested to take risk. It has been found that the profit margin of only 0.50 ha. of mulberry land is equivalent to corresponding production of rice on 2.5 hectares of land.

In case this profit margin decreases substantially between the two crops the farmers would prefer rice to mulberry. To make rice cultivation viable, the farmer needs a minimum land holding size of 2.5 hectares. If the land holding size is less, the output resulting from rice cultivation would be insufficient for surplus investment in other kinds of farm operations. In

Table 5.3

Average cost of production of paddy in West Bengal, 1981

Items	Production per ha/annum		Income (Rs.)
	Expenditure		
	Actual Rs.	% to total	
1. Land preparation	150	1.84	
2. Preparation of seed beds (for 2 crops)	200	2.45	
3. Labour charge (for preparation of land, sowing, transplantation, irrigation and harvesting) 500 man-days @ Rs.800 per day	4,000	49.07	Sale value of paddy 4,800 Kg. h.y.v. and 2,200 Kg. local total 7,000 Kg. @ Rs. 125/- per kg. = Rs. 8,750. Sale value of excess straw after its use as fodder = Rs.50
4. Fertiliser cost 200 Kg. @ Rs.8.00 per Kg.	1,600	19.63	
5. Irrigation rate (10 days of watering per crop @ Rs.100 per day 2 crops h.y.v. and traditional).	2,000	24.53	
6. Pesticides 2 Kg. @ Rs. 100 per Kg.	200	2.45	
Total	Rs . 8,150		8,850
Cash income or profit =			Rs.650.00

order to substantiate the subsistence income, the farmer thinks it wise to devote a minimum portion of land (0.5 ha.) to mulberry which fetches a

high price.

From the percentage to total cost, it further emerges that in this case major expenditure is on hired labour (49%) followed by irrigation charges and fertiliser cost in case of high yielding rice.

Economics of Production for Non-Mulberry Sericulture

The viability of non-mulberry sericulture in West Bengal has already been stressed upon in an earlier section of this discussion. The non-mulberry sector covers two sectors of production, namely tasar in the western part of the State and eri in the northern part. Tasar silkworms are fed by the leaves of the following trees, viz., Asan (*Terminalla tomentosa*), Arjun (*Terminalla arjuna*), Sal (*Shorea robusta*), Sidha (*Lagerstroemia parviflora*) etc. which are grown in natural state within the forest of the region. Eri silkworms on the other hand thrive on the leaves of castor plants which need systematic cultivation for healthy growth. It, therefore, becomes apparent that the cost of production of leaves which are feed materials to silkworms is practically negligible for tasar but like mulberry sericulture, castor farming needs certain amount of investment. So labour charge in tasar culture is somewhat less than in eri culture. Other wise eri-culture is more or less similar to that of mulberry culture.

Detailed discussion of the cost structure of tasar sericulture is noted below (Vide Table 5.4).

As eri-culture has only recently been introduced in isolated pockets of Duars region in North Bengal, any analysis of cost structure will fail to give a realistic picture of the cost of production at a commercial scale. Moreover, eri-culture is carried in experimental farms of the Lutheran World Service and the State Government. As such its cost structure has not been worked out in detail, particularly because production cost in such farms are invariably higher than those practised by the villagers.

Tasar : In the western districts of the State tasar silkworms are reared in isolated pockets in the districts of Bankura and Purulia. Attempts are now being made to introduce it in viable areas of Birbhum and Midnapore districts as well. In Bankura and Purulia districts there are patches of forests wherein tasar host plants are naturally grown. In this area there is a high concentration of tribal population who are economically and culturally dependent on the forests. So the villagers of these two districts, particularly located on the outskirts of the forests are in the practice of rearing of tasar silkworms on the host plants. Moreover, rearing is carried by the villagers as spare time occupation. The scale of rearing also depends upon the

availability of host plants and the spare hands in the family. It is therefore difficult to assess the cost structure of tasar rearing based on per hectare as has been done on mulberry. The only input is the cost of seed cocoons and availability of family labour. The cost of seed cocoons also varies in a very wide range depending on the availability of cocoons during different seasons. Moreover, the cost structure of indigenous tasar cocoons and high yielding Daba cocoons also records variations. However, on the basis of field investigations the cost of rearing of tasar cocoons has been calculated with particular reference to Bankura and Purulia districts (Vide Table 5.4).

Table 5.4

Average cost of production in tasar culture, 1981

Item	Production per ha./annum			
	Expenditure (Rs.)		Income (Rs.)	
	Traditional	Improved	Traditional	Improved
1 Plantation cost	Nil	500	Rearing capacity = 100 d.f.l. = 3 Kg. of cocoons	Rearing capacity = 400 d.f.l. = 12 Kg. of cocoons
2 Maintenance cost of plantation	Nil	1,000	Sale value of cocoons @ Rs. 250/- per Kg. = Rs. 750/-	Sale value of cocoons @ Rs. 350 per Kg. = Rs. 4,200/-
3 Cost of silkworm seed	20	30		
4 Labour required for rearing (50 man-days @ Rs. 8/- per man day ; 90 man-days under improved practice)	400	720		

Table 5.4 (Contd.)

Item	Production per ha./annum			
	Expenditure		Income (Rs.)	
	Traditional	Improved	Traditional	Improved
5. Miscellaneous expenditure	30	250		
Total	Rs. 450	2,500	750	4,200

Cash income or profit under traditional practice = Rs. 300.00

Under improved practice = Rs. 1, 700.00

An analysis of the cost structure, however, indicates that the culture and rearing of tasar cocoons require maximum investment on labour. However, the accurate cost structure is difficult to arrive at because occasionally the rearing operations are carried by family members which do not entail any expenditure on wage rate. It may also be mentioned in this connection that tasar cocoons in this region are sold by numbers and not by weight because there is weight loss from green stage of cocoons to dry stage of cocoons. So, if the cocoons are sold in numbers only, the weight loss therefore does not affect cost of reeling operations from the commercial point of view. The yield is measured by Kahan consisting of 1280 in numbers. On an average 1 Kahan measures 1.2 Kg. cocoons.

Conclusion :

An analysis of the cost structure of production of silkworms in both mulberry and non-mulberry sectors indicates a general profitability of cocoon rearing in the State. In case of mulberry cocoon the profit margin is considerably higher than those of tasar and eri, but mulberry based cocoon requires substantial capital investment which is beyond the reach of average farmers. The profit margin in tasar and eri is less but the investment is also less and as such even the poorest farmer can reap the benefit from the system. It may also be mentioned that in many areas various facets of sericulture operations (namely production of mulberry or host plants and cocoon rearing, reeling and weaving are carried separately, e.g., in Malda 90% of the operations belong to mulberry production, silkworm rearing, and reeling of yarns, whereas Murshidabad depends mainly on reeling and weaving). Integration of various operations; however, will substantially cut down the cost of production for the finished products. (Economics of integrated production has been more elaborately discussed in the next

Chapter). In this process, the profit margin of the producers will be higher and the consumer price of the finished products will be lower, thereby creating good conditions for the expansion of domestic markets of West Bengal silk fabrics.

CHAPTER VI

MANUFACTURING PROCESSES : ECONOMICS OF PRODUCTION

The economics of mulberry and non-mulberry cocoon production have already been discussed before (vide Chapter V). The subsequent stages of silk processing, manufacturing of silk yarns from cocoons and then to the production of silk piece goods are discussed here. Like other industries, concentration of manufacturing centres of sericulture is dependent on availability of raw-materials (viz., good quality silk yarns), capital (institutional and non-institutional), skilled artisans, accessibility to urban market etc.

It has been found that silk manufacturing centres have diverse locational character. In most of the areas the concentration pattern is closely related to distribution of particular caste or tribe who have acquired specialisation in their respective fields from their forefathers than on market and capital. This is true particularly in respect to non-mulberry silk weaving (tasar and eri) centres. In this sector large-scale commercialisation is yet to be achieved. Therefore, the combined factors of market and transport on the one hand and finance on the other, do not determine their location.

Location of mulberry based weaving centres, however is partially guided by the traditional laws of industrial location. For example concentration of weaving centres in and around Murshidabad is due to availability of yarn from neighbouring Malda district (Kaliachak), facility of good communication network and proximity to Calcutta market.

Manufacturing Processes

The manufacturing processes of both mulberry and non-mulberry sectors of the industry consist of reeling of silk yarns and their subsequent weaving into various silk fabrics, and dyeing and printing of woven fabrics into silk piece goods.

A. Reeling

The reeling of silk yarn from cocoons is carried by the village craftsmen in their domestic basins. So it is entirely a cottage industry. The major silk reeling centres of the State are located at Malda, Murshidabad and Birbhum districts. Of these centres Kaliachak and English Bazar in Malda district, Balaspur-Panchgram in Murshidabad district, Raipur-Nalhati in Birbhum district are most important.

The reeling operations are usually carried by primitive techniques (in

Charkha or country basins) by the family members. In many cases reeling is carried on behalf of the local 'mahajan' (money-lender who also acts as a middleman) who advances necessary finance for the operation. In this system, the craftsmen are entirely dependent on the merchants who procure raw-materials, i.e., yarn. The village craftsmen are employed by these middlemen at a wage fixed on a piece rate, that is on the quantity of yarn produced. The reeled yarns are sold by these middlemen in the market.

These 'mahajans' or middlemen act as intermediaries between the reelers and the weavers. Most of the reelers have not any direct contact with the weavers. With a view to overcoming this problem, about 30% of the reelers have now been brought under the organised sector by the Sericulture Department of the State Government. More and more units in Malda, Murshidabad, Birbhum districts are now being brought within the Khadi Commission, Co-operative Societies, and other registered Societies and also within other government institutions, where the reelers work as wage labourers. In these units improved machines have been introduced which produce better quality yarns with higher productivity per Kg. of yarn. It has been estimated that in the ordinary country basins about 230 gms. of yarn are produced per day from 1 Kg. of dry weight indigenous variety of cocoons. The production of yarn, however, comes to about 1,000 gm./day if reeled in improved basins from the same quantity of raw materials. The production is higher in case of bi-voltine varieties of cocoons.

Economics of Yarn Production (Mulberry Sector) :

The cost-benefit analysis of reeling operations is difficult to assess because the cost of yarn production depends on the prices of cocoons which fluctuate from season to season, labour wage rate and market demand. Occasionally the reeling operations are carried by the women, old members of the family and in some cases even by the children. Sometimes hired labours are also engaged for the task. The cost structure of the organised sector is slightly higher than the private sector. Taking all these factors into consideration, the cost-benefit analysis of reeling operations in the State has been worked out (Vide Table 6.1).

It becomes apparent from the analysis of cost-benefit of reeling operations that the profit margin under both sectors is marginal. In case of bi-voltine cocoon, the labour charges are higher, consequently profit is also higher. However, majority of the yarn production comes from indigenous variety and the artisans get very little remuneration.

Table 6.1

Cost-benefit analysis of silk yarn production in mulberry sector in West Bengal, 1982

Items of Expenditure	Per 1 Kg. of yarn Organised Sector Value (Rs.)		
	Indigenous	Bi-voltine	Private Sector
Cost of 4.33 Kg. and 4.5 Kg dry wt. cocoon			
i) @Rs.50/- per Kg.	216.50		225.00
ii) @ Rs 65/- per Kg.	280.00		
Reeling wage/Kg of yarn	30.00	45.00	15.00
Fuel cost	20.00	30.00	15.00
5% establishment charge	15.00	13.00	13.00
Total cost	281.50	373.00	268.00
Sale value of 1 kg.yarn	300.00	400.00	285.00
Net Profit	18.50	27.00	17.00

(Source : Compiled from the field survey conducted at Malda, Murshidabad, 1980).

NOTE - Cocoon price is fixed on a 'Kakeme' system. This is a Japanese system of cocoon price fixation where the 'renditta' (i.e., the quantity of green cocoons by weight required to yield an unit weight of reeled silk) is taken into consideration.

Economics of Yarn Production (Non-Mulberry Sector) :

In case of tasar culture the yarn is usually spun instead of reeled because of the prevalence of crude methods of reeling. It is hand spun by the womenfolk in Takli - a wooden instrument for hand-spinning . This is carried purely on cottage basis particularly by the tribal women in the villages. The yarn thus produced is known as 'ghicha'. In such system, high percentage of silk is wasted during spun-yarn production. It has been estimated that the waste may amount to 200 gms. in every 1,000 gms. of spun-yarn produced. The quantum of yarn production, however, depends on 'eco race' of the tasar cocoons. In case of high yielding 'Daba' and 'Railey' varieties, the procurement of yarn is high. The cost-benefit analysis of the production of tasar yarns has been calculated (Vide Table 6.2). The margin of profit in such operation tends to be low.

In eri-culture, a separate cost structure for reeling operations is difficult to work out because production in this sector is integrated. Moreover, eri-culture is now being carried purely on an experimental basis. Attempts are now being made to revive this culture in Jalpaiguri district by the Lutheran World Service, where it was previously in vogue about a few decades back.

Table 6.2

Cost-benefit analysis of tasar silk yarn production in West Bengal, 1981

Items of expenditure	Per 1 Kg. of yarn Value (Rs.)
Cost of 1 Kg. of cocoon	275.00
Reeling charge	30.00
Total cost of 1 Kg. yarn (800 gms. + 200 gms. of waste product)	305.00
Sale value of yarn (800 gms. + 200 gms. = 250.60)	310.00
Cash Income = Rs. 5.00	

(Source : Compiled from the field survey conducted at Birbhum, 1980).

NOTE - 1 Kg. of tasar cocoon produces 800 gms. of yarn and 200 gms. of waste.

By-Products of Reeling : The by-products obtained from reeling are utilised in other processes which bring down the cost of reeling operations. The two principal by-products obtained from reeling operations are the silk waste and pupa. The silk waste is generally known as 'matka', 'jhute' etc. in case of mulberry and 'kete' in tasar based reeling operations. These are spun into coarse quality silk thread and used mostly for blending with other threads. Other waste product, viz., pupa is used for extraction of oil. The deoiled pupa is used as poultry feed.

B. Weaving

The weaving of silk fabrics is carried in selected centres of Murshidabad, Birbhum, Bankura and Purulia districts. The important centres of weaving are located at Chak-Islampur (Raninagar P.S., Murshidabad District), Boswa-Tantipara (Rampurhat and Rajnagar P.S., Birbhum District), Bishnupur-Sonamukhi (Bankura District) and at Raghunathpur (Purulia District). The weaving operations are carried mostly in pit and jacquard looms.

System of Weaving Operations : Three systems of weaving operations are prevalent in West Bengal. These are as follows:-

i) Private weavers are carrying this operation entirely on their own. This category is termed as 'finance and order system'. In this system the yarns are purchased either from the open market or from individual reelers. The fabrics are produced by the weavers at their homes in their domestic looms. The woven fabrics are sold either to the local dealers or middlemen or at the local market. This category covers only 10% of the total weavers.

ii) The weavers working in the co-operative societies and Khadi Commission belong to the second category. In such cases, the weavers are wage earners. Their wages are fixed on piece-rate basis from the respective institutions. These wage weavers have to work at the looms owned by the organisations. This category of weavers cover approximately 30% of the total. Here a certain degree of mechanisation has been achieved and semi-automatic Chittaranjan looms, fly-shuttle looms, semi-automatic Benaras looms etc. have been installed, whereby a greater efficiency in production has been achieved (under the traditional loom the output per weaver per day is 2.75 m, while under the improved loom the production increases to 7.5 m. per day). This is true for mulberry based weaving. Within this sector a certain degree of integration has also been achieved.

iii) The rest covering about 60% of the total number are engaged in 'dadan' system or 'cash-advance' system of work. Under this system the total requirement of yarn (48 Kg. per annum) is supplied to the weavers by the middlemen (mahajan). About 9 to 10 silk dealers thus operate in West Bengal. The merchant is at liberty to deduct wages if the quality of woven fabrics is inferior. Hence there is always a chance of exploitation of these weavers by the dealers. Any surplus thus generated by the system is the product of the labour of the artisans. The benefit of such surplus is enjoyed by the middlemen. This kind of weaving operation is in practice for a long period. As such, it is a pity to note a higher percentage of the weaving class is under the dominance of parasitic middlemen or mahajans.

Economics of Weaving Operations (Mulberry Sector) :

Cost-benefit analysis of silk-weaving is indeed a difficult task. There is no fixed wage rate of weavers in the private sector. The wage rate sometimes depend on the quality and category of fabrics produced. However, in the organised sector, the weaving operations are on the whole remunerative. Depending on intensive investigations carried in the principal weaving centres of the State, an estimate of the average cost structure in weaving

has been worked out. It is evident from the analysis that weaving operations in private sector is somewhat more remunerative than the organised sector. The profit margin of weaving of double-thread is marginally less than that of single thread fabrics (Vide Tables 6.3 and 6.4) under the private sector.

It may be pointed out in this connection that bulk of the profit of the private sector is appropriated by the silk merchants/dealers who either advance money to the private weavers or supply the bulk of yarn taking into consideration the percentage of waste in advance. As actual price of

Table 6.3

Cost-benefit analysis of weaving silk fabrics under organised sector in Murshidabad, 1981

per 11 m. of fabrics requiring 600 gms. of yarn as raw material

Items of expenditure	Single Thread value in Rs.	Double Thread value in Rs.
Cost of 600 gms. yarn	170.00	220.00
Weaving wage	50.00	60.00
Dyeing & Printing	50.00	50.00
Margin of 25%	67.00	82.50
Cost price	270.00	330.00
Sale value	337.00	412.50
Net Profit	67.00	82.50

(Source : Field studies conducted at Chandra Kanta Lalit Mohan Resham Khadi Samity, Khagra, Berhampore, by the author).

Table 6.4

Cost-benefit analysis of weaving silk fabrics under private sector in Murshidabad, 1981.

per 11 m. of fabrics requiring 600 gms. of yarn as raw material

Items of expenditure	Single Thread value in Rs.	Double Thread value in Rs.
Cost of 600 gms. yarn (including Mahajan's/ dealer's profit)	130.00	160.00
Weaving wage	30.00	40.00

Table 6.4 (Contd.)

Items of expenditure	Single Thread value in Rs.	Double Thread value in Rs.
Dyeing & Printing	50.00	60.00
Total cost	210.00	260.00
Sale value	300.00	325.00
. . . Net Profit	90.00	65.00

(Source : Compiled from the field studies conducted at Chak-Islampur, Murshidabad by the author).

fabrics is difficult to determine, there is considerable scope for exploitation in the process.

Non-Mulberry Sector : In case of weaving tasar and eri yarns, the factors of production are more or less similar to those of mulberry yarn, mainly with minor variations.

The tasar sector is much more disorganised than the mulberry sector and the scale of operation is much smaller in the former. Tasar weaving is carried entirely on cottage basis in most of the regions of West Bengal. However, attempts have been made to bring the weavers under the co-operative sector at Raghunathpur in Purulia District and a certain degree of efficiency has been achieved (Vide Tables 6.5 and 6.6).

Table 6.5

Cost-benefit analysis of weaving tasar silk fabrics under organised sector in Purulia District, 1982

per 12 m. of fabrics requiring 1 Kg. of yarn
as raw material

Items of expenditure	Value (Rs.)
Cost of 1 Kg. yarn	250.00
Weaving wage	60.00
Processing charges	15.00
Total cost	325.00
Sale value	380.00
. . . Net Profit	55.00

(Source : Compiled from the field studies conducted at Raghunathpur, Purulia by the author).

Table 6.6

Cost-benefit analysis of weaving tasar silk fabrics under private sector in
Purulia District, 1982

per 12 m. of fabrics requiring 1 Kg. of yarn
as raw material

Items of expenditure	Value (Rs.)
Cost of 1 kg. yarn	250.00
Weaving wage	60.00
Processing charges	12.00
Total cost	322.00
Sale value	350.00
∴ Net Profit	28.00

(Source : Compiled from the field studies conducted at Raghunathpur,
Purulia by the author).

Economics of Integrated Production of Newly Introduced

Eri Silk : Innovation of eri-culture in West Bengal is a comparatively recent phenomenon. The spinning and weaving of eri fabrics are confined within the 'Mech' communities in Duars area near Madarihat. Production of eri fabrics has not yet attained much significance in the State. However, with the efforts of the Lutheran World Service and the State Government, attempts are being made to rehabilitate the tribal people of the said region and a certain degree of integration between different stages of processing has been achieved. At present West Bengal produces about 6,000 Kg. of eri yarns and 72,000 m. of eri fabrics in a year.

The production of eri fabrics is still being carried on an experimental scale. The limited number of tribal people engaged in eri-culture usually work in organised units as reelers and weavers against wages. Naturally the cost structure is high in this sector. Moreover, most of the labour-artisans receive a substantial subsidy to undertake the job. In this sector the processing is carried in the same place where the experimental farms are set up. Marketing of the piece goods lies with the co-operative societies. The labour wage rate is difficult to compute because family labour is occasionally engaged. This is undertaken as a cottage industry wherein primitive methods of reeling and weaving are still practised. In the registered units, improved machinery (spindle charkha) has been installed which records a higher productive rate of spinning (500 gms. of yarn per day).

Depending on the intensive field studies conducted at Madarihat,

Jalpaiguri District, an estimation of the integrated cost structure of eri fabric production has been worked out. The profit margin in this sector is meagre (Vide Table 6.7). It may be mentioned that most of the fabrics are used for domestic purposes.

Table 6.7

Cost-benefit analysis of eri silk fabrics under organised sector in
Jalpaiguri, 1982

per 3 m. of fabrics requiring 800 gms. of yarn
as raw material

Items of Expenditure	Value (Rs.)
Cost of 800 gms. of yarn	20.00
Requirement of soda for boiling	1.00
Spinning wage	25.00
Weaving wage	30.00
Total cost	76.00
Sale value	50.00 to 130.00
∴ Net Profit	54.00

(Source : Compiled from the field studies conducted at Madarihat, Jalpaiguri District, by the author).

The sale value ranges from Rs.50.00 to Rs.130.00 depending on the category of the fabrics produced. Since the fabrics are seldom sold, the low profit margin does not affect the artisans adversely.

Production of Silk Piece-Goods

After weaving, the next stage of processing is printing and dyeing of woven fabrics with a view to having different categories of silk fabrics. The printing sector is entirely operated by big or small entrepreneurs. The number of persons in individual unit vary from 8 to 10. However, there are a few big units where the number of skilled artisans may exceed 50. The average production per unit is 3 to 4 sarees per day, depending on the design and size, the maximum may go up to 6 sarees of 5½ m. each. The wage rate depends on the skill of the printer. The rate varies between Rs.120 - Rs.150 - per month. In addition, an amount of Rs.5/- is given to the printer per saree. The wage rate varies with the design.

The whole-sale market price of one printed saree is Rs.110.00, while the retail price for the same is fixed in between Rs.150/- and Rs.180/-.

Major Categories of Fabrics

The following categories of silk fabrics are produced in West Bengal :

1) **Printed Silk Saree** : Of the printed varieties, there are four groups, each

group is distinct from the other depending on the technique of printing.

i) **Block Printing** - In this method a wooden block is used for printing the design on every saree.

ii) **Screen Printing** - In this method the design is reproduced on the fabrics through screens.

iii) **Batique Printing** - This is a very special and artistic method of reproducing an intricate design on fabrics by waxing method. In this method a special skill is required and the production is much less (15 sarees per month). Hence the wage rate is much higher in this sector, depending on the number of colours used on each piece (Rs.12/- per worker in case of 3 colour application, and Rs.15/- per worker in case of 6 colours applied on each saree).

iv) **Marble Printing** - This technique of printing has recently been introduced in West bengal and therefore is not widely prevalent.

2) **Woven Bordered Silk Saree** : Under this category, the exquisite varieties of silk sarees are produced in the handloom sector. The classical example being the baluchari saree of Bishnupur (Bankura), korial and 'gorod' (made from unbleached yarn) of Mirzapur (Murshidabad).

3) Printed scarves, stoles, handkerchiefs, ties and dress materials etc.

4) Silk shirtings, suitings, coatings, and furnishing fabrics.

5) Balkal fabrics.

6) Matka fabrics.

7) Jhute fabrics.

8) Kete fabrics.

Of these, unbleached silk constitutes 70% of the total mulberry silk piece goods (kora fabric), matka (the coarser variety) contributes 15% of the bleached yarn fabrics. 'Gorod' contributes about 10% and the mixed fabrics contribute the rest, i.e., 5% of the total production.

In this connection it may be mentioned that almost entire silk piece goods produced in this State come from the handloom sector.

Employment in Silk Processing Sectors

First, the employment pattern in the manufacturing sector shows interesting pattern. The duration of work, the wage rate and skill of the workers vary from private enterprise to organised government establishments. In the former sector labour wage rate is low, skill is less, and fixation of work hours is arbitrary. In the organised sector the hours

of work are fixed, wage rate is based on piece goods, designs etc., and skill of labour is high. Hence the organised sector is much more efficient than the private sector. The wage rate in the units of the Khadi Commission is the standard for all the small units of the State. This wage chart is referred here so as to get an accurate idea about the variation in the wage rate of the weavers (Vide Table 6.8).

Under the private sector, the wage rate varies. It may range anywhere from Rs.30.00 to Rs.40.00 per 11 m. of unbleached fabric. Superior quality fabrics are not produced under this sector. The rate is fixed arbitrarily depending on quality, quantity and categories of fabrics produced.

Table 6.8

Wage rate of skilled artisans engaged in the weaving of silk khadi fabrics in West Bengal, 1981

Categories of fabrics	Size (m.xm)	Wt.of cloth (gm.)	Actual weaving wages (Rs.)	Additional weaving wages (Rs.)	Total weaving wages (Rs.)
Silk Balu-char saree with boti and cross border - double colour	15.5x1.18	550	120.31	123.69	244.00
Tasar balu-char saree-double colour	15.5x1.18	520	143.39	20.61	164.00
Silk double golani Jacquard saree	15.5x1.18	575	172.76	7.24	180.00
Silk check fita border saree	5.02x1.15	485	77.00	18.00	95.00
Silk Daccai saree	5.64x1.15	390	172.76	1.24	174.00
Silk jari Baluchar (gold)	5.64x1.15	370	134.75	115.25	250.00

Table 6.8 (Contd.)

Categories of fabrics	Size (m.xm)	Wt.of cloth (gm.)	Actual weaving wages (Rs.)	Additional weaving wages (Rs.)	Total weaving wages (Rs.)
Silk jari baluchar saree (white)	5.64x1.15	400	134.75	—	134.75
Plain Korial saree	4.58x1.16	363	81.90	—	81.90
Garod Korial with design plain border	4.58x1.16	430	81.90	58.10	140.00
Korial saree with jari buti anchala	4.59x1.16	592	75.60	79.40	155.00
Tasar saree bleached	4.58x1.22	360	1.71	2.85	
Garod dhuti plain	4.18x1.21	235	1.60	2.66	
Jari border dhuti	4.18x1.25	278	2.26	3.78	
Garod jari	6.26x1.13	400	2.58	4.31	
Plain chadar	2.10x1.13	130	1.38	2.30	
Milk white garod than	10.05x.90	650	—	—	110.00
Cream than (nistari)	10.05x.90	600	—	—	79.50
White than (Japanese)	10.05x.90	600	—	—	80.03
Silk dress piece than	10.05x .90	605	—	—	147.84

Table 6.8 (Contd.)

Categories of fabrics	Size (m.xm)	Wt.of cloth (gm.)	Actual weav- ing wages (Rs.)	Addi- tional weaving wages (Rs.)	Total weav- ing wages (Rs.)
Silk twisted coloured than	10.05x.90	700	—	—	68.00
Bleached white than	10.05x.90	670	—	—	72.93
Silk chou- tary than	10.05x.72	580	—	—	41.14
Silk tasar shirting	10.05x.90	750	—	—	39.27
Silk white coating	1408x.71	2,100	—	—	69.30
Silk colour coating	1408x.71	2,100	—	—	75.00
Silk hand- kerchief	10.05x1.14	700	—	—	60.66
T.T. Kora than	10.05x1.20	700	—	—	64.96
T.T. Blea- ched than	10.97x.90	850	—	—	47.94
Tasar shirting	10.05x.90	700	—	—	87.98
Silk white than (Sona- mukhi)	10.05x.90	560	—	—	39.27
Plain chadar	2.10x1.13	130	—	—	1.90
Jari border chadar	2.50x1.25	145	—	—	3.68

(Source : Khadi and Village Industries Commission, Calcutta).

Classification of Labour in Sericulture

Most of the reeling and weaving units fall within the category of cottage sector while those of printing are within the small-scale sector.

Furthermore, there is a clear distinction between rural labour engaged in cultivation, rearing, reeling, weaving and urban labour engaged in printing and dyeing.

Of the total number of workers engaged in reeling and weaving, about 60% are engaged in the private enterprises. Of this 60%, approximately 10-15% are master reellers and weavers, the rest are daily wage or contract wage labourers. In the cottage sector the labour involvement may entail the entire family labour including the small children, old people and women who help in the various stages of production, from the processing of yarns to finished fabrics. On an average, 4-5 persons per family are being considered under employment within the cottage sector. Employment in all the sectors of sericulture is permanent and thus becomes a labour intensive industry. The total number of persons employed under various sectors have been estimated at 357,850 in West Bengal, in 1981. In 1980-81 the total employment in sericulture has gone down to 286,085 persons. This may be due to the involvement of a large number of casual workers in the informal sector. The following table gives a comparative picture between 1980-81

Table 6.9

Employment in different sectors of sericulture

Sectors of Production	Number of persons employed 1980-81
Mulberry cultivation and silkworm rearing	297,000
Spinning, reeling and twisting	22,050
Weaving	38,800
Ancillary activities including finishing and marketing of fabrics	N.A.
Total	357,850

(Source : Directorate of Sericulture and Silk-Weaving, Govt. of West Bengal, Calcutta).

Besides, a large number of persons get employment indirectly in its trade and commerce. It is difficult to ascertain this figure as well as those who act as middlemen in its processing and trade.

Weavers in Handloom Sector : The silk weavers hold a predominant position amongst the handloom weavers in the State, as most of the silk fabric production of West Bengal comes from the handloom sector. A large section of the rural population are engaged in this cottage based industry.

The total number of artisans engaged in weaving in West Bengal have been estimated as 47,350, of which about 28,410 are employed under the private sector, about 14,205 in the organised sector and about 4,735 persons operate as individual village-entrepreneurs. In the organised sector, the artisan-weavers are permanent employees with fixed salaries and other benefits. In the private sector, the individual weavers are temporary employees with no fixed wage rate. They are therefore, exposed to market imperfections. Despite such constraints, the efficiency of labourers is high.

Employment in Printing Units

A large number of printing units are located in Calcutta where the average number of persons employed vary between 10 and 50 per unit. These small printing units employ job workers who procure the fabrics from government sources and partly from the private parties of other States and supply the finished products. The wage rate is fixed on per piece of silk goods.

The amount of investment necessary in such printing processes may vary from Rs.10/- to Rs.20/-. The cost may increase upto Rs.60/- in case of a saree length of 5.5 m. depending on colour and design. The wages are given on a piece rate basis ranging from Rs.5.00 and above. In case of heavy printing the charges are fixed at Rs.8/- to Rs.10/- per saree, The value of output per printer per month on an average comes to Rs.500/-. In case of batique printing, the time required per piece is much more than that of block printing and screen printing. On an average two days are required to print one batique saree, whereas in case of block printing the time requirement is only 2 hours.

However, to complete the entire processing of eight stages starting from boiling to finishing, a minimum of 4 days are required.

In the printing sector too, there is a fair chance of profit maximisation by the private entrepreneurs. The usual practice is that of giving low wage to the printers and extraction of more work from them during the boom period, at the same time deteriorating the quality by introducing mass-scale

production. However, on an average one batik printer can produce only 15 pieces of saree per month. The piece rate for such sarees is fixed at Rs.12/- in case of three coloured and Rs.15/- in case of six coloured saree. In case of block and screen printing, the turn-over of an individual printer may be upto 100 sarees per month.

Printing industry on the whole is a profit-earning sector but in recent years with the increased inflation rate, the value of inputs including the cost of chemicals, dyes, fuels etc. have gone up and consequently the profit margin has come down.

Comparative Advantages of Mulberry and Non-mulberry Silk Manufacturing

From the above analysis of the economics of production (Vide Ch.V) of mulberry and non-mulberry silk fabrics, it becomes apparent that mulberry silk production fetches more profit than the non-mulberry sector because of greater ecological and economic advantages enjoyed by the former (Vide Table 6.9)

Table 6.9

Comparative production cost of mulberry and non-mulberry sericulture under organised and private sectors in West Bengal, 1982
(in terms of finished fabrics)

Items	Value in Rs.		
	Mulberry	Tasar	Eri
Cost of finished fabric	210-330	300	76
Sale value	300-412	350-380	130
Net profit	90-82*	50-80	54

Unit = 1 Kg. yarn = 11 m. of fabric, 12 m. and 3 m. respectively, mulberry, tasar, eri.

(Source : Computed from Tables 4, 5 and 6).

*In case of double thread fabric, the profit is marginally less under the private sector, while in case of single thread fabric profit is more under the private sector.

It therefore becomes imperative that production of double thread fabric is profitable only under the organised sector. Under the private sector, however, production of single thread fabric is more profitable because of low overhead cost and a low wage rate.

The consumption of fabrics from non-mulberry silk yarn is comparatively less because market is not fully developed, production is still at a subsistence level and is continued more for economic rehabilitation of the marginal farmers and poor artisans. An accurate estimation of the cumulative cost structure of various sectors of mulberry and non-mulberry is difficult to attain because of spatio-sectoral disjunction of production sectors.

However, it is evident from the study that the profit margin increases if the various sectors of sericulture operations, viz., mulberry and culture of host plants, cocoon rearing, reeling of silk yarns and weaving operation are integrated together. In such cases, considerable economy may be achieved by avoiding transport cost in assembling raw materials from different centres, minimising duplication of labour and in restricting speculations of the product market by the middlemen.

From the above analysis it may be concluded that the silk processing in West Bengal is now in between feudalistic and capitalist stage of production. As such, the precapitalist mode of production is prevalent amongst the reelers and weavers of rural areas and a transitory phase is slowly being ushered in. The wage reelers and weavers are separated from the means of production, in this case reeling basins and weaving looms, as they are working mostly under 'putting out' or 'finance and capital system' where the tools of production are supplied by the mahajans and the value of production is appropriated by them. The primary producers i.e. reelers/weavers are still petty commodity producers working for merchants. The capitalist stage of production is not achieved as the labour process is functioning as wage earners either at a centralised workshop or in individual small units. There is practically no private ownership of the means of production barring a very few exceptional cases in occasional villages, all the weavers are wage earners. Since there is evidence of co-operative movements in rural areas and efforts are being made to bring the wage reelers and wage weavers under its wing, it could be stated that a transitory phase is initiated. However, the transition is not fully attained yet, as there is no large-scale development of commodity production and trade.

To overcome this factor-market dichotomy the new type of market nexus with organised distribution centres have been developed in rural areas. These registered units in major silk producing regions have adapted an integrated mode of production, so that profit maximisation motive is curtailed and an assured income is provided to the primary producers. This kind of welfare economics is now being experimented at various levels of rural and urban economy, the sustained effect of which will take a few more years to be of some significance.

CHAPTER VII

TRADE AND COMMERCE

Historical Perspectives

Although the practice of sericulture was well-known in West Bengal as early as medieval and late medieval period, the systematic development of trade with foreign countries attained a commercial significance after the inception of British East India Company during the 17th century. The flourishing state of silk industry in Bengal was first known from the travel accounts of Bernier, Tavernier etc. during the 17th century (A.D. 1656-1668, 1676). Silk fabrics of Murshidabad were then carried on, both internally through the river channels and externally by maritime routes to Holland and Japan. At the beginning of the century, the Dutch and the Portuguese took particular interest in silk yarn and fabrics. The main centres of production were Kasimbazar and Jangipur in Murshidabad district. The finished fabrics of slightly coarser quality were exported to Kabul and its neighbourhood in Afganistan.

By the end of the 17th century, the East India Company acquired full control over silk production in Bengal. The industry followed an upward trend till the middle of the 18th century, after which the period of decline commenced. Till 1835, the Company continued their internal trade in Bengal silk, after which the industry was left to its own course of development.

Table 7.1

Export of silk yarn from Bengal to Great Britain, 1773-1891

Year	Export (in Kg.)	Year	Export (in Kg.)
1773	65,599	1833	314,482
1783	274,981	1855	516,978
1793	331,236	1865	712,053
1803	182,291	1875	745,206
1813	374,350	1885	704,205
1823	382,800	1891	707,946

(Source : Watt, G. (1908) : Dictionary of the Economic Products of India, Vol. VI, Part III).

The export of silk yarn from Bengal had passed through several stages of ups and downs (Table 7.1, Fig. 6). During the first half of the period concerned, the nature of export was mainly of reeled mulberry silk yarn, but during the latter part the nature of commodity changed. The quantity

exported was mainly waste mulberry silk and also non-mulberry silk goods. After 1885, there seems to be a decline in the trend of export because of multiple reasons attributed to socio-economic conditions prevailing at that time.

The domestic trade in silk yarn was then confined in the port cities of Calcutta, Madras and Bombay. During later years, silk trade lost its significance because of import from foreign countries.

Trade During the Pre-War Period

After 1890, the British Government took several measures to revive the silk industry of Bengal, as a result of which the industry showed positive signs of improvement. The industry suffered again because of the outbreak of World War I and also during the depression of 1930's. However, tariff protection was granted to the industry for the first time during 1934. The main objective of such protection was to revive the past glory of the industry and to check its decay.

During World War II there was a sudden spurt in demand for silk goods to cater to the needs of war. The silk export trade received a boom and maintained a steady growth up to the pre-independence period.

Silk Trade After Independence

The main task after independence was to consolidate the various branches of silk manufacturing. The most important measure taken for the development of the industry was the establishment of Central Silk Board under a special act of Parliament in 1949. Emphasis was given at this stage to encourage the development of domestic trade, and to put a stop on the import of raw silk. Further, there was a regional focus of development of silk trade and subsequently Karnataka and Tamil Nadu became new areas of cocoon and silk yarn production.

After independence, emphasis was given on the production of filature silk of international standard at a competitive cost. At this stage the cost of production of raw silk in India was found to be too high compared to Japan and other major silk producing countries. Karnataka opted for filature production while West Bengal still preferred 'Charkha' silk or country basin type of reeling units. As a result, there is differential quality in the production of silk in the country. As filature silk is more uniform, and of greater durability, Karnataka silk is immediately favoured with good market both within and outside the country.

At present Karnataka is the principal supplier of raw silk in the country. West Bengal has to import about 17% of her requirements of superior quality yarn from Karnataka.

The Present Pattern of Yarn Trade (Mulberry and Non-Mulberry) :

It may be mentioned that in sericulture there are two categories of

EXPORT OF SILK YARN FROM BENGAL TO GREAT BRITAIN (1773 - 1891)

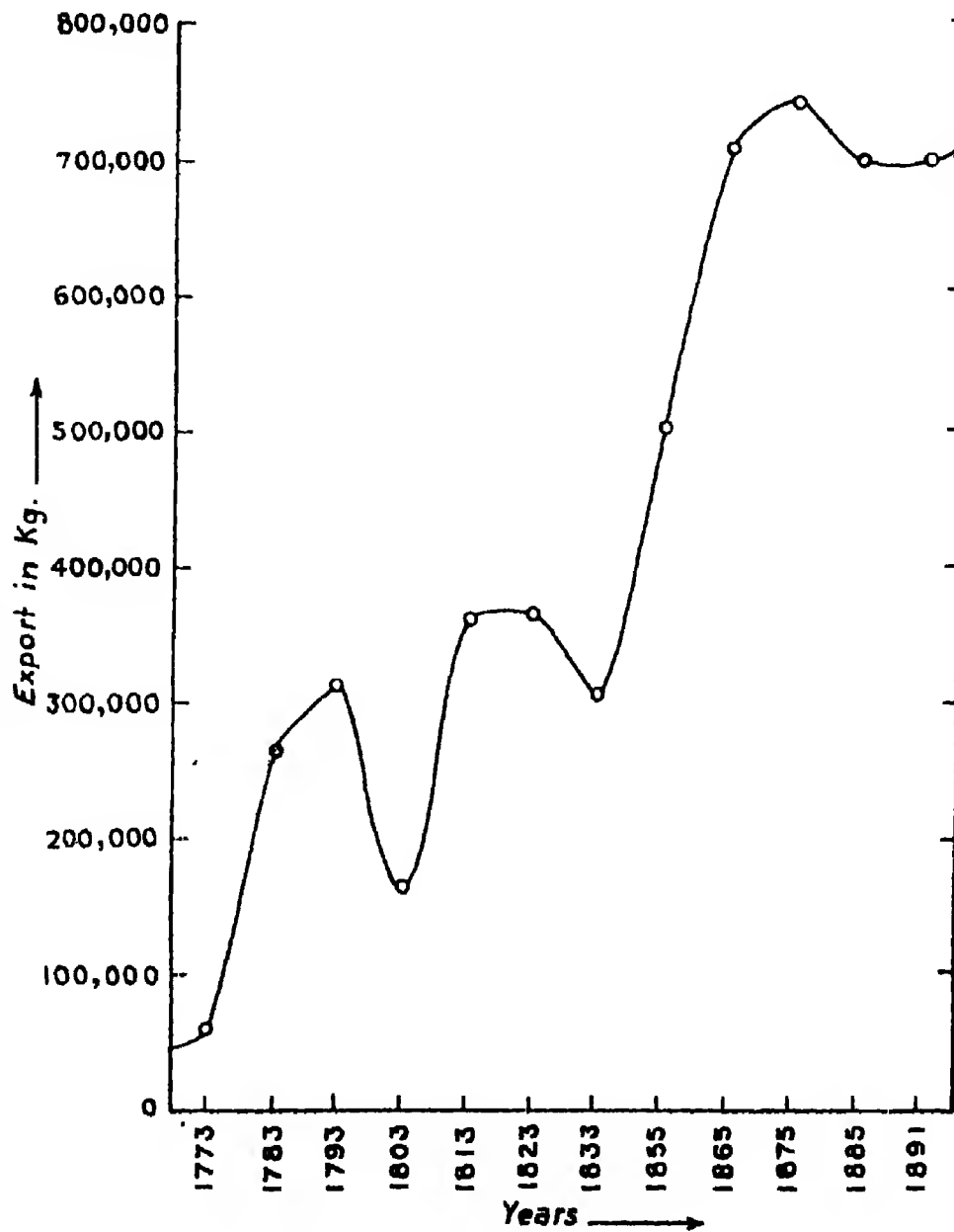


Fig. 6

commodities, namely yarn and fabric, which are utilised for trade purposes.

Some of the regions are exclusive producers of mulberry and non-mulberry yarn (e.g., Malda of mulberry, and Birbhum and Purulia of tasar) while others specialise in weaving (e.g., Murshidabad, Bankura etc.). For the latter centres, yarn has to be purchased from the neighbouring regions.

This kind of transactions are carried between the various States of India too. For example the North-Indian weaving centres (Benaras, Gazipur etc.) do not produce yarn, therefore they entirely depend on yarn from either Karnataka or West Bengal.

In respect to tasar, it is evident that majority of the weaving centres of West Bengal get their yarn supply from surrounding States of Bihar and Orissa. But in this case the trade in yarn is of much less commercial significance because this sector operates at a cottage industry level. Occasionally the domestic market is impeded by imported Chinese tasar yarns. This yarn is of superior quality and the price is also low. This, however, hampers the domestic yarn production endangering the interests of the primary producers.

It should be noted that most of the yarn (mulberry) in West Bengal is reeled or spun in primitive methods without any device to ensure uniformity, smoothness and cleanliness of the yarn. Hence the yarn produced here is not suitable for the production of good quality silk fabrics. As such, the weaving units of the State has to depend partially on other States, specially on Karnataka for their requirements of superior yarns. About one-fifth of her total requirements is brought from other States. On the other hand about 50% of the inferior quality yarns produced in West Bengal, is sent to the other States particularly to the important weaving centres of Uttar Pradesh. The remaining 50% of the local production is consumed by the weaving units of the States.

The price of good quality yarn is not fixed by the government. Hence the yarn trade is controlled by private dealers. These traders supply yarn to the wage weavers. The yarn produced by Madhughat filature is entirely consumed by the weaving units of the State Government and those operated by the Rehabilitation Industrial Corporation (RIC) located in Malda district. Therefore, production falls short of local demand.

It is needless to mention that the price of superior quality yarn is too high for private weavers. At times the supply is inadequate. Hence the private weavers are obliged to depend on the traders who supply yarn at a cheaper rate without due consideration to its quality. These private traders are quite numerous in number. They help to generate more surplus by expropriating the labours of the poor artisans. This surplus is not fully utilised for productive purposes as the traders keep a high margin of profit.

This systematic exploitation enhances the dependency ratio of wage Weavers to the capitalist merchants.

Another feature which emerges from the above trade pattern is the common practice of blending of yarn of different qualities. This results in the lack of uniformity in the quality of the final product. This unfair trade in yarn is one of the major reasons for deterioration of quality of silk fabrics in the State. This trend adversely affects the quantum of consumption of silk fabrics. It is difficult to improve the quality despite increased financial assistance from the banks and other authorities. Unless quality yarn is supplied to the respective weavers by the Government or other agencies, it is difficult to eradicate this malady.

Marketing of Silk Khadi Fabrics : The volume of inter-State trade in silk between West Bengal with Karnataka or with other States is difficult to assess because of lack of statistics. Secondly, a large quantity of yarn and fabrics are exchanged between the States through private bodies. However, it is possible to assess the volume of trade carried by the Khadi Commission outside West Bengal, and within the State. During 1977-78 the value of fabrics sold within the State was well over Rs. 8,653,000/- and during 1979-80 it rose to Rs. 11,610,000/-. The value of fabrics sold outside West Bengal was estimated as Rs. 13,420,000/- in 1977-78 which subsequently rose to Rs. 27,846,000/- during 1979-80. This substantiates the fact that external trade fetches more cash than internal trade as far as organised sector is concerned.

Of the total quantity of 1,650,000 sq.m. of fabrics produced in 1979-80, about 27 per cent of the total (442,000 sq.m.) was sold. Of this sale, about 419,000 sq.m. of fabrics were sold outside West Bengal. This shows that a major part of wholesale trade is with outside States.

The export trade of silk fabrics like scarves, stoles, shawls, dress and furnishing materials constitutes about 20% of the total production*. It is quite apparent that about 63 per cent of the production of the private sector is consumed within the State.

It maybe of interest to note that about 70 to 80% of the yarn requirements of West Bengal are brought from Karnataka. Only the fabrics are woven by the Bengal weavers. Dyeing and printing of fabrics are also done here. Therefore, in most of cases, the end products are popularly known as 'Mysore silk'. Consequently, production of exclusive Bengal silks is confined within the organised sector, constituting about 40% of the total production of this industry in West Bengal.

[*Note - From private communication with Priya Gopal Bishayee, a dealer in Calcutta.]

Production in Khadi Sector : Khadi and Village Industries Commission is a Government Institution (Central) which is engaged in rehabilitating the rural artisans and craftsmen through the revival of the various cottage industries. This is primarily a welfare organisation. Several small institutions are brought under its wing so as to attain a higher production efficiency. Sericulture is one of the various sectors, which has been brought under Khadi Commission with a view to improving production and to achieve socio-economic upliftment of sericulturists and weavers. In Khadi sector, however, production of silk fabrics in West Bengal is quite significant and foremost in the country.

Table 7.2

Percentage share of West Bengal in Khadi silk to all-India production
(1972-80 average)

(On P.C.)

Year	Quantity	Value
1972-73	48.29	37.82
1973-74	40.68	34.93
1974-75	45.64	41.99
1975-76	50.34	42.82
1976-77	72.12	59.50
1977-78	51.39	48.33
1978-79	56.28	49.84

(Source : Khadi and Village Industries Commission, Calcutta, 1981).

In Khadi sector, the production of West Bengal is over 50 per cent of the national average. As production in Khadi sector is more viable in West Bengal, steps should be taken to bring more units within the Khadi sector. The marketing is also more organised here and outside sale is more efficiently handled by this sector.

Commodity Value and Sale Value : During 1979-80 the Khadi sector in West Bengal has produced various silk fabrics in West Bengal, worth of Rs.42,500,000/-. The products are sold both in wholesale as well as in retail markets. The sale value of the products in wholesale market was Rs.39,456,000/- and that in retail market was Rs.8,261,000/- . Therefore the total market value of the silk fabrics has been estimated at Rs.47,717,000. The sector, therefore, earned a net profit of Rs.5,217,000/-.

Over the last few years, the value of mulberry yarn and fabrics has increased. There had been a significant fall in the values of the commodities during 1969-70 and 1973-74. However since 1977-78 the value of silk products in West Bengal records progressive improvement thereby

indicating increasing popularity of Bengal silk, both in internal and domestic market.

About 75% of the total sale is carried on during the puja and festival seasons. On Gandhi-Jayanti, there is the convention of annual rebate which the retail shop-keepers enjoy. They get reimbursement from Khadi and Village Industries Commission at the end of the year.

Table 7.3

The average sale of silk products through Khadi Commission and Co-operative Societies, 1979-80

Highest annual sale in 1979-80		Lowest annual sale in 1979-80	
Direct Co-operative society	Indirect Co-operative society	Direct Co-operative society	Indirect Co-operative society
4,000,000	6,000,000	150,000	250,000

(Source : Information compiled from the various sales counter of Khadi and Village Industries Commission and Co-operative Societies in Calcutta (Survey conducted by Equitable Marketing Agency, 1979-80).

Table 7.4

Average sale of silk fabrics by private sector in some markets of Calcutta, 1980.

Name of the market	Average sale per shop (Rs./day)	Highest sale of the season (Rs./day)	The amount of credit from the 'mahajan' (Rs.)	Remarks
Gariahat	250-3,000	30,000 (Sept.-Oct.)	10,000 to 70,000	Mostly old shops having personal relation with 'mahajans'
College Street	200-2,000	22,000 (Sept.-Oct.)	8,000 to 25,000	
Shyambazar	200-2,000	15,000 (Sept.-Oct.)	30,000 to 50,000	

(Source : Information compiled from the retail sales counter of different shops in Calcutta (Survey conducted by E.M.A. during 1979-80).

WEST BENGAL PRODUCTION & EXPORT OF SILK FABRICS

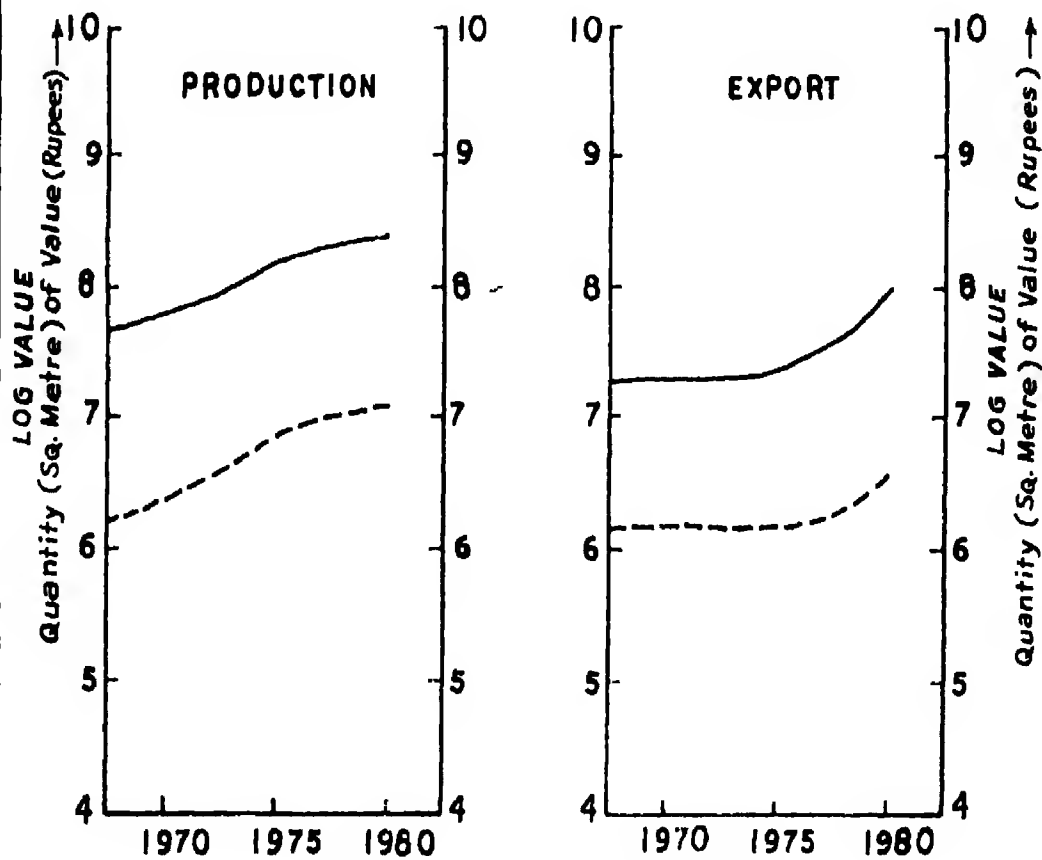


Fig 7

It is evident that non-institutional credit still has an important impact on the silk trade of the State (Vide Table 7.4). In this matter, goodwill between the consumers and producers is far more important than financial security.

West Bengal Silk in National and International Perspective

India ranks fifth amongst the important silk producing countries of the world and accounts for about 5% of global output of mulberry raw silk. This position has been significantly improved since then. At present India ranks third among the mulberry silk producing countries of the world accounting for about 12% of the total world production. Within India, West Bengal ranks second position within the silk producing States, catering about 15% of the total (mulberry) silk output. Karnataka ranks first catering about 80% of the total requirement of the country.

In non-mulberry sericulture the contribution of West Bengal is only about 2% to the national total (Tasar and eri). In eri silk, the chief producer is Assam contributing about 88%, while in tasar silk the chief producer is Bihar contributing about 63% followed by Madhya Pradesh and Orissa. In the production of non-mulberry silk India ranks second in the world.

Sericulture is an export-oriented sector of the economy with an annual foreign exchange earning of about Rs.300,000,000/-. Of this West Bengal's share was 14% (according to the figure of 1977). During 1980 the share has increased to 23.23%. During 1986 the annual export earning for the country increased to Rs.1,598,200,000/-. Of this West Bengal's share was only 10%. This is an alarming prospect indicating a fall in West Bengal's share of export.

Tariff Protection

Sericulture industry is protected against competition from foreign raw silk and the current rate of productive duty levied on raw silk is 30% *ad valorem* plus an auxiliary duty of 5% *ad valorem*.

The present attitude of the government is to discourage the import of raw silk and encourage the import of foreign race seeds of cocoons free of duty with a view to expediting the production of improved variety of cocoons having a higher yield rate.

Demand in Overseas Market

Despite higher prices and comparatively inferior quality to that of Japan and China, the Indian silk is much in demand in overseas countries because of its traditional nature, exquisite design and intricate craftsmanship. Therefore, with more diversities in production lines, Indian silk is expected to get a better market in overseas countries.

Another vital information is that silk production in the temperate countries has reached a point of saturation. The global demand for silk fabrics, both of mulberry and non-mulberry sectors, on the other hand is steadily increasing over the past few decades. This has created an opportunity for Indian products to explore the international market and consequently increase her volume of silk export.

The West European countries, the U.S.A. and Japan have now become leading consumer countries of silk. Korea and Brazil have now become the chief suppliers of raw silk to these countries.

Export

Growth of export market in silk is essentially a recent phenomenon. At present production is oriented to export market. It has become evident from the various field surveys conducted at important weaving centres of West Bengal that even a wage-weaver is now well aware of the export market. There are certain looms which are exclusively kept for weaving quality garments for export. Consequently, the income of the average weaver is related to the price in the export market.

It may be noted that production of silk fabrics has increased during the last 10 years by more than 3 times. The export trade has likewise been increased by about 3 times. It may, therefore, be assumed that production is boosted up due to increase in demand of Indian fabrics in overseas market (Vide Fig. 7).

Table 7.5

Production and export of silk fabrics from Calcutta

Year	Production		Export	
	Quantity (in sq.m)	Value (Rs.)	Quantity (in sq.m)	Value (Rs.)
1970	2,909,500	64,009,000	1,467,918	21,087,749
1975	7,590,000	166,980,000	1,586,000	28,570,000
1980	12,776,500	281,083,000	4,098,557	104,409,245
1985	16,170,000	355,740,000	2,942,651	132,766,266
1986	17,160,000	377,520,000	5,864,459	315,407,151

(Source : Central Silk Board, Calcutta Regional Office, 1981).

It may be noted that during the last decade the volume of export of silk goods from Calcutta has recorded a substantial increase by about 305%. After 1980, however, the position has changed. During 1980 and also 1981, West Bengal's share to the national export has come down although in terms of absolute value it has increased. This only proves the fact that other

Table 7.6
Categories of fabrics exported through Calcutta during 1970 - 1988.

Categories of fabrics	1970		1975		1980		1985		1988	
	Quantum sq.m.	Value Rs.	Quantum sq.m.	Value Rs.	Quantum sq.m.	Value Rs.	Quantum sq.m.	Value Rs.	Quantum sq.m.	Value Rs.
Dress materials	395,242	7,823,914	201,000	5,307,000	1,217,698	43,112,149	1,476,417	23,159,097	2,517,436	169,558,762
Scarves/Stoles	1,043,835	12,785,518	1,360,000	22,277,000	2,829,449	49,728,751	1,368,561	97,022,862	4,128,904	103,530,131
Sarees	12,464	181,265	13,000	291,000	45,656	1,017,014	16,396	809,263	3,587	417,253
Readymade garments	8,464	143,846	5,000	138,000	362,284	15,305,415	70,450	10,864,040	25,304	3,083,038
Ties	7,034	132,272	—	—	—	—	6,739	511,869	—	—
Others	879	20,933	7,000	527,000	28,607	1,587,015	3,323	256,073	49,527	2,941,006

(Source : Central Silk Board Regional Office, Calcutta, 1989).

Table 7.7
Percentage of categories of fabrics exported through Calcutta during 1970 - 1985.

Categories of fabrics	Figures in per cent			
	1970	1975	1980	1985
Dress materials	26.92	12.67	27.15	21.50
Scarves/Stoles	71.10	85.75	63.10	56.41
Sarees	0.84	0.81	1.01	1.89
Readymade garments	0.57	0.31	8.08	2.54
Ties	0.47	—	—	—
Others	0.05	0.44	0.63	0.23

(Source : Computed from Table 7.6).

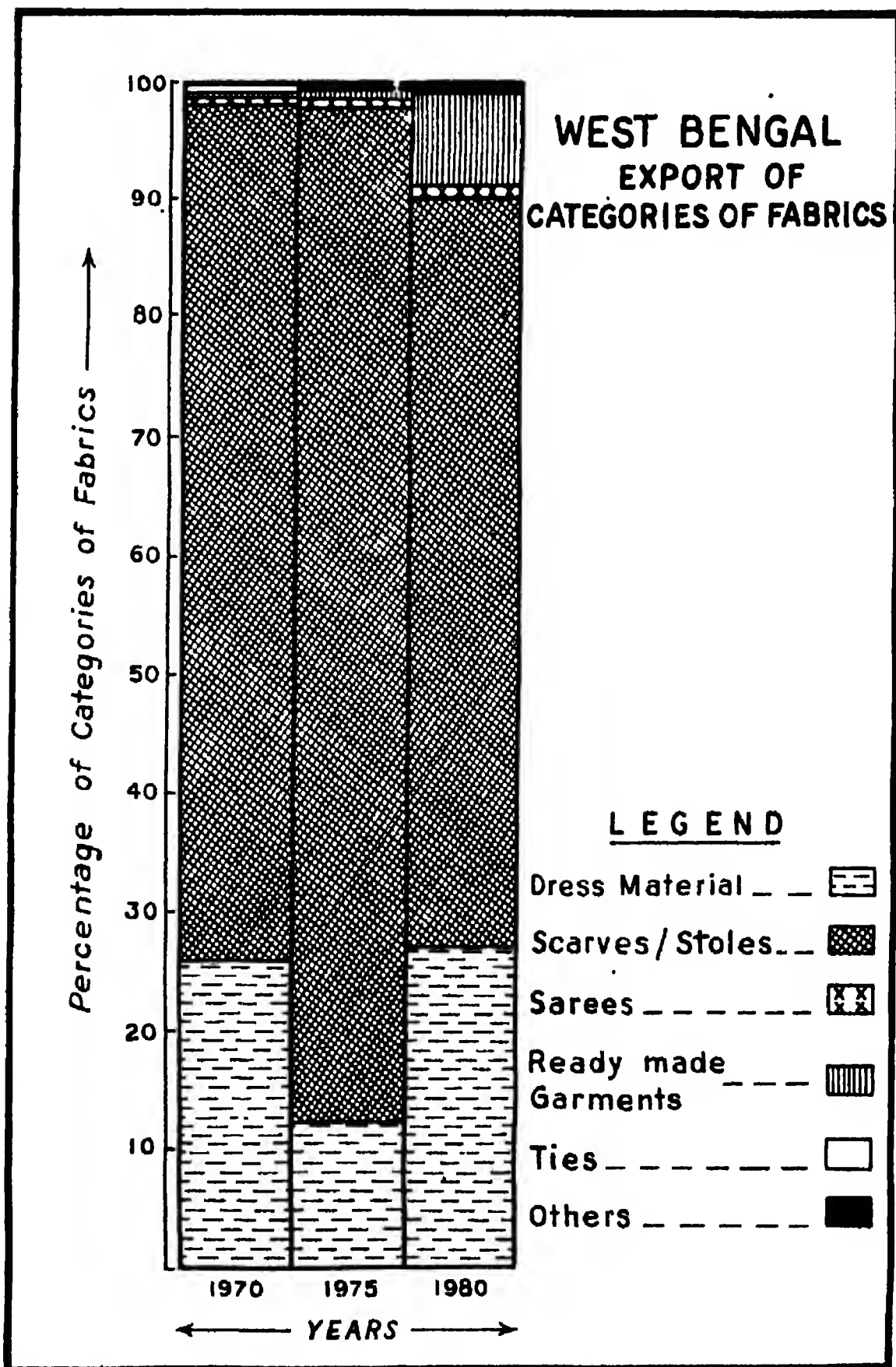


Fig. 8

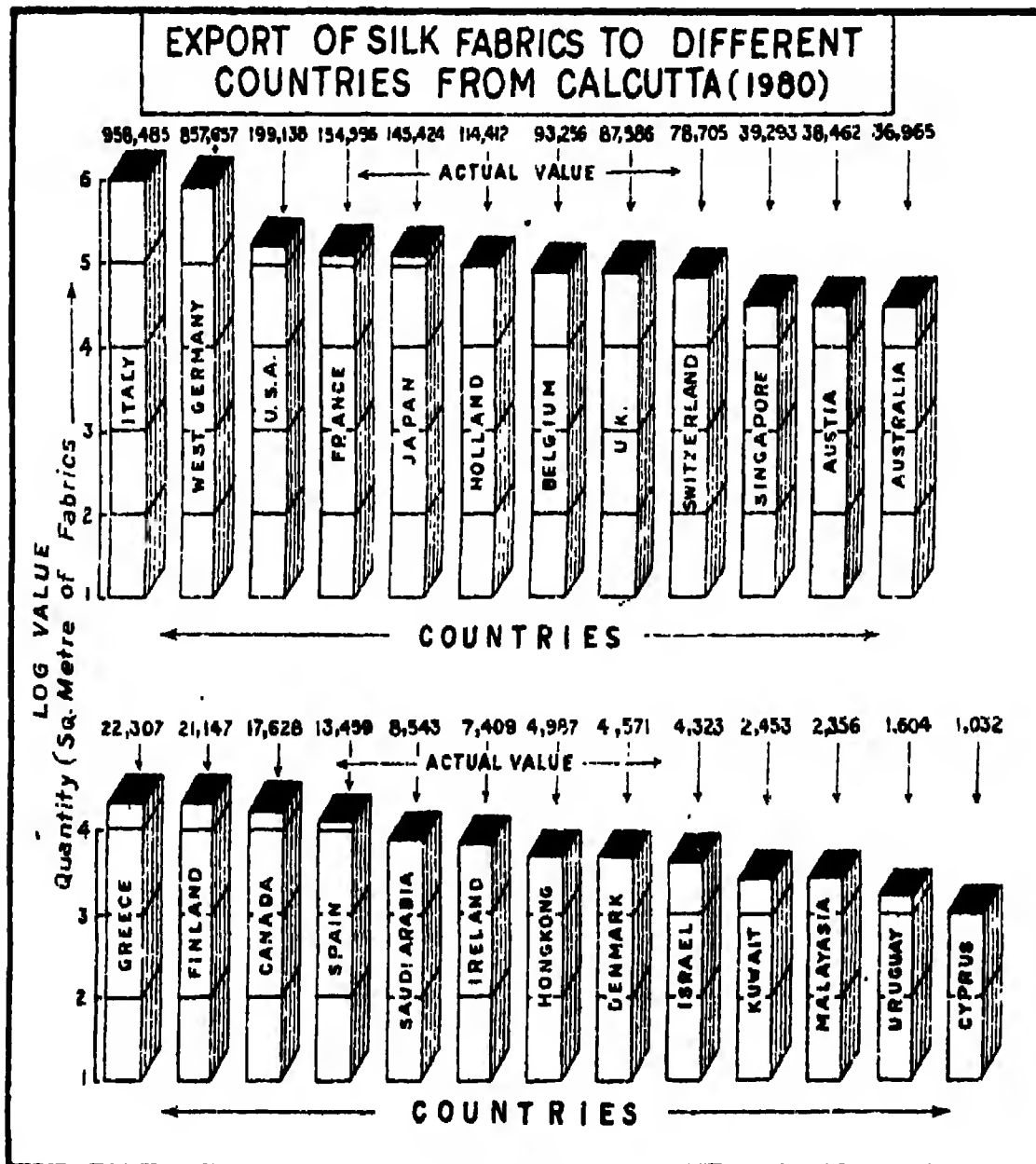


Fig. 9

Table 7.8
Percentage share of export of West Bengal to national total (1970 - 1985 average)

Year	India		West Bengal		% of West Bengal to all - India	
	Quality (in sq.m.)	Value (Rs.)	Quality (in sq.m.)	Value (Rs.)	Quality (in %)	Value (%)
1970	8,609,000	134,992,000	1,845,928	27,663,973	21.44	20.49
1975	5,752,000	150,159,000	2,021,000	39,286,000	35.13	26.16
1980	11,868,579	510,497,131	4,639,381	118,598,870	39.08	23.23
1985	172,766,266	1,480,124,000	2,942,651	132,766,266	17.04	8.96

(Source : Central Silk Board, 1986).

*Data for India shows 1985-86 Financial Year.

states have picked up production at a faster rate and they are contributing to the national total in large volume than before. Of the various categories of fabrics exported, scarves and stoles have recorded maximum increase, being followed by dress materials and sarees. During 1975, there was a fall in the export of dress materials. However, the export of dress materials picked up its former position in 1980. Last year there had been a significant rise in the volume of export of readymade garments, thereby indicating its demand in international market (Vide Fig. 8).

It may not be out of place to point out that the export market of Indian silk goods is not stationary. It fluctuates in every year. The export policy of the government, therefore, should pay emphasis on a secured market so that a stabilisation is attained. The price of the standard products needs to be stabilised, as large number of weavers are dependent on export market. It is said that during the last few years the quality of various categories of fabrics has deteriorated to some extent, thereby affecting the consumption pattern adversely. It is necessary to maintain quality control of the products so as to keep the product price at a reasonable level of stabilisation.

The traditional export markets are South-East Asian countries and African countries while the non-traditional markets are in the U. S. A., West Germany, former U. S. S. R., U. K., Japan and Canada (Vide Fig. 9).

Table 7.9

Percentage share of export of various categories of silk fabrics of West Bengal to national total, 1970 - 1980.

Figures in P. C.

Year	Dressmaterials	Scarves/Stoles	Sarees	Readymade garments	Ties	Others
1970						
Qn.	30.75	18.57	2.26	3.37	7.03	4.18
Value	31.00	16.99	1.81	2.07	4.10	3.14
1975						
Qn.	23.61	57.16	0.90	2.17	—	19.44
Value	20.90	53.54	0.65	1.85	—	6.00
1980						
Qn.	43.53	91.49	1.91	26.10	—	3.79
Value	37.26	90.06	1.04	26.42	—	5.60

(Source : Central Silk Board, Calcutta, 1981).

It becomes evident that the export share of West Bengal to the national total has increased from 21% in 1970 to 39% in 1980. In value West Bengal

EXPORT OF TASAR FABRICS FROM CALCUTTA (1970-1980)

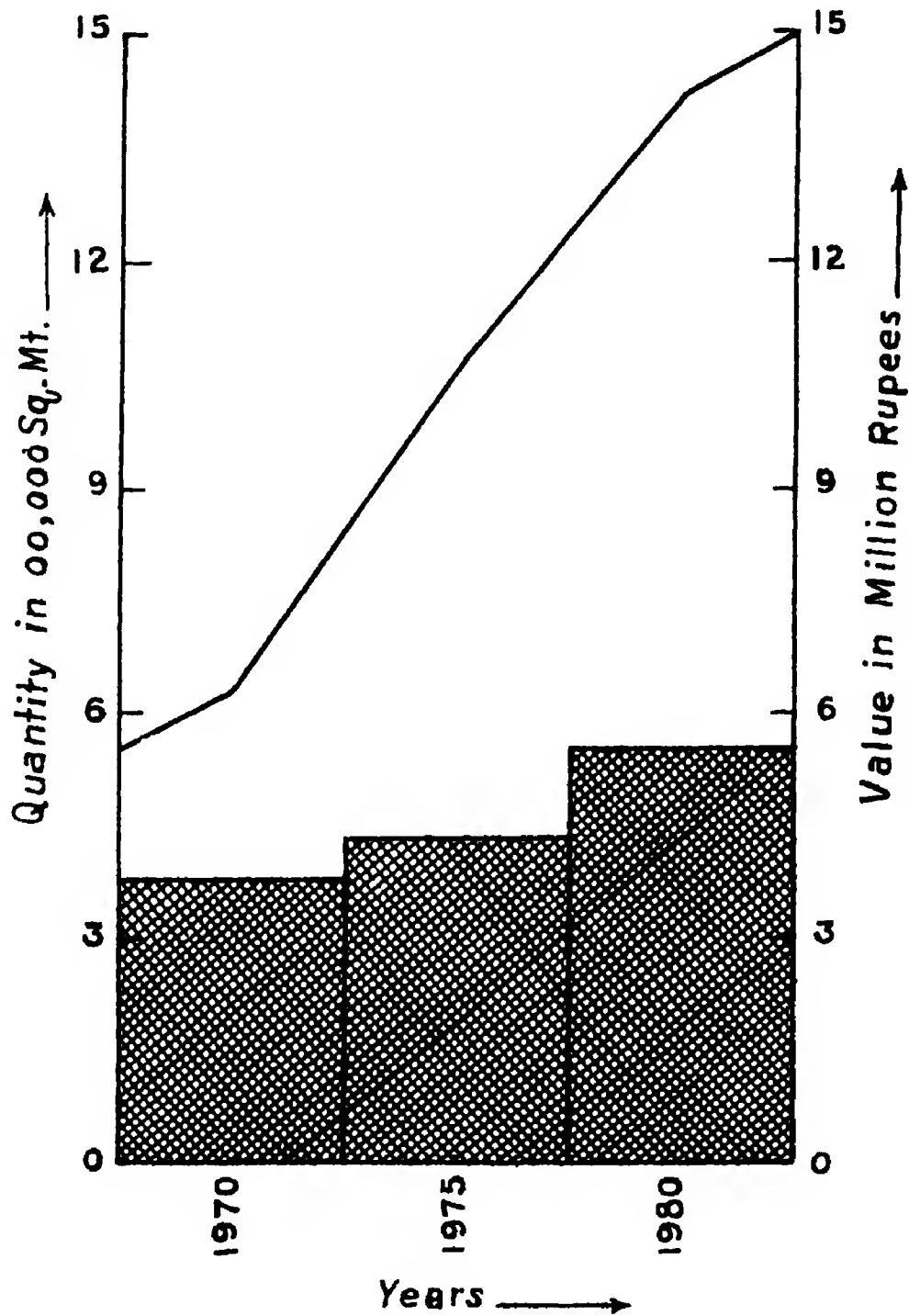


Fig.10

claims about one-fourth of the national total. In 1980 the percentage share of West Bengal has decreased because of cheap imported yarn from China, merely bringing down the cost of production. This has resulted in a decrease in the final value of export.

Calcutta generally exports silk scarves/stoles and other dress materials to overseas countries. Export of other categories of fabrics, particularly sarees, is negligible. The volume of ready-made garments exported from Calcutta during 1980 has increased than the previous years. This clearly indicates that unless there is even greater diversification of fabrics particularly that of dress materials and ready-made garments the total quantum will not be of any significant value in the international export market.

Export of Tasar Fabrics : Production of tasar silk is insignificant in West Bengal, contributing only 2% of the national total. However, field studies reveal that the tasar sector possesses geo-economic viability for future expansion. As it stands today, West Bengal is exporting only one variety of fabric, i.e., tasar dress-material (Vide Fig. 10).

Table 7.10

Export of tasar fabrics from Calcutta (1977 - 1988)

Years	Quantity (sq.m.)	Value (Rs.)
1970	378,010	6,576,225
1975	435,00	10,716,000
1980	540,824	14,189,625
1985	512,993	23,548,712
1988	375,375	18,863,331

(Source : Central Silk Board, Regional Office Calcutta, 1981).

The export of tasar silk is gaining ground since 1970. It is certain that tasar materials have an expanding international market. If West Bengal organises tasar sector in a systematic manner, it will have a ready export market.

Import of Raw Silk

At present due to the government policy, import of silk yarn is restricted and a heavy duty is imposed on import. In spite of this, during 1979-80, there was an import of tasar yarn from China which brought down the prices of domestic yarns. Although at present there is a shortage of quality yarn of both mulberry and tasar in the country, yet the policy of the government is to encourage the production of quality yarn rather than import.

Government Policy : In 1955, the Government of India has accepted the recommendations of the Central Silk Board to channelise import and distribution of silk yarn through the Central Silk Board with the specific purpose of safeguarding the interests of indigenous producers. Between 1955 and 1974, the Central Silk Board was importing raw silk on behalf of the State Trading Corporation and distributing the same to the actual users and exporters. Import policy of silk yarn was dechannelised during the period July 1964- March 1970, when imports were permitted only against replenishment licences earned against the exports of silk goods. The channelisation of imports through the Central Silk Board was again revived with effect from 1st. April 1970. As per the current import policy, the holder of import replenishment licence may directly import raw silk to the extent of the licence permits. Import of spun silk yarn has been discontinued since 1962.

Conclusion

During the last 30 years there has been a positive shift in the trade pattern and policy. The export value of silk production of the country exceeded Rs.510,000,000/- during 1980. The national target of export during 1982-83 has been fixed at Rs.1,000,000,000/-. The national export value has increased to Rs.1,598,200,000/- during 1985-86.

This has affected the overall economy in various ways. The number of persons employed have increased. The income of the people engaged in sericulture activities has also increased. At present the entire production is modulated to cater to the needs of export market. This has an adverse effect on sericulture. In West Bengal several traditional looms have been abandoned to meet for quick export order. The weavers are engaged in the production of fabrics having export market. Moreover, in case of any change in international price, the economic conditions of the primary producers are likely to be adversely affected.

Of the various problems associated with trade and commerce in silk fabrics in West Bengal the following appears to be most important :-

- i) There is an unhealthy competition between the filature and Charkha silk yarn creating a differential quality and price.
- ii) The production cost of mulberry cocoon is very high particularly in West Bengal due to low average reeling capacity of filament length in cocoons.
- iii) Moreover there is a shortage of silk yarn production in the State.
- iv) There exists a competition between powerloom and handloom production particularly in the context of overseas trade. In our country, there is an emphasis on handloom production. Therefore,

the strategy should be to diversify the products as much as possible. At the moment because of high cost of production and raw material scarcity it is difficult to sustain production at a competitive cost in respect of overseas trade. Therefore bulk should be compensated for high cost price.

- v) In West Bengal there is a wide seasonal fluctuation in the prices of cocoon and yarn. This affects adversely both production and consumption of fabrics.
- vi) Insufficient capital is the major drawback of a developing economy. This holds good for silk trade. The medium-scale entrepreneurs cannot operate profitably because of lack of finance.
- vii) Absence of good market network hampers trade. Because of lack of data, inter-regional and intra-regional trade flow are difficult to quantify. Though considerable amount of silk yarn and fabric are being exchanged every year between various States, no official record is maintained. About 70% of the trade is conducted through private traders.
- viii) Over and above, there is lack of co-ordination between different sectors and in each sector a large amount of profit is being shared by the middlemen. In this respect the Central Government has taken various policy measures such as formulation of handloom development policy and mobilisation of co-operative societies so as to remove the existing constraints in the supply of yarn, technical know-how to the loomless weavers etc. The Ministry of Industries of the central Government has further decided to set up co-operative projects in major silk producing regions. With these aims in view, the National Handloom Development Corporation (NHDC) has been set up with the specific objective for the procurement and distribution of yarn, marketing of cloth, assistance to State handloom corporation in establishing spinning mills, procurement and distribution of dyes and chemicals etc. Besides, it will act as the principal agent of the Central Government for the development of handloom industry in various States.
- ix) The existing system of import policy has set limitations in fostering international trade of Indian silk fabrics. The Central Government has recently revised its import policy. At present for the export of every Kilogram of mulberry silk fabrics, import of 1.33 Kg. of mulberry raw silk (yarn) of 'A' and 'B' grades as per international standard are permitted. Of this import of 1.33 Kg., 1.25 Kg. are allowed to

be imported without any duty levied on it. It may be mentioned that the private exporters have consistently shown dissatisfaction regarding the obstructionist policy of the Central Silk Board. Exporters are faced with numerous problems including the differential rates of the export quota system in West Europe and Scandinavia, rising input costs and stiff competition from countries like Hong Kong, Taiwan, Korea, Singapore and Sri Lanka. They regretted that the government had not thought fit to restore cash assistance for quota items.

It becomes apparent that the authorities are well aware of existing constraints, but there still exists a gap between the policy measures formulated and their subsequent implementation. The future of silk textile industry of the State appears to be promising provided a harmony is established between the demand and supply.

The global demand of silk is showing signs of improvement, recording a growth rate of 5% per annum, for the next few years. Therefore, if a balance is achieved between the production and exports, the overall trade and commerce will be better organised. The Tariff Commission has made an in-depth analysis of the various aspects of sericulture from time to time. It has recommended the following measures to revitalise sericulture in the country :-

- i) An early legislation to ensure licenced seed producing grainages, adequately equipped for testing of layings.,
- ii) Establishment of raw material bank with the objective of centralising procurement programme, supplying essential raw materials to manufacturers and exporters, taking measures for the stabilisation of markets and allowing remunerative prices to primary producers and other ancillary matters.

Outlook

West Bengal's strategy in this respect would be to concentrate on diversification of her handloom products and step up production of superior quality yarns. The price of cocoon and yarn should be stabilised so as to ensure a steady supply of raw-materials. At the same time efforts should be made to initiate powerloom production in silk fabrics based on the supply of silk yarns from filatures. The institutional finance should be better organised and the benefit of this should reach the average producers and artisans. The blending of differential quality of yarns by the private weavers should be checked. All these will improve the quality of various silk-piece goods and will be helpful in reviving the past glory of silk fabrics of this state.

CHAPTER VIII

GROWTH CONSTRAINTS

It is a great concern to note that inspite of traditional prosperity and acceptance of Bengal silk to the consumers, West Bengal is presently facing difficulties in silk production and marketing. It will not be out of place to identify growth constraints of this industry which act as deterrents to further growth and prosperity of sericulture in West Bengal. The existing constraints are partly ecological, partly economic and partly institutional in nature.

Ecological Constraints

It has already been said that natural environment like relief, drainage and soils are found to be ideal for mulberry cultivation in West Bengal. However, climate is not so favourable everywhere for mulberry cultivation and rearing of silkworms at least for a part of the year. The combination of high temperature, rainfall and humidity affect the rearing of bi-voltine (high-yielding in terms of yarn, both quality and quantity of yarn is higher in bi-voltine worms than in multi-voltine) variety of silkworm during the greater part of the year, particularly in the southern and eastern districts. In this respect, Karnataka is favourably located because of her congenial climate. As such Karnataka ranks higher both in production as well as in the quality of cocoon production than West Bengal.

The western districts of the State are drought prone areas mainly due to uneven distribution of precipitation. This pre-condition demands greater and a regular irrigation facility for mulberry cultivation. It may be also observed in this context, that yield of mulberry is highest in all the districts during July-August. But the season is least suitable for the rearing of multi-voltine cocoons. It is therefore apparent that the absolute ecological conditions at least in some portions of the State are not congenial for silkworm rearing. The relative climatic conditions within the rearing chambers can, however, be somewhat modified in case of mulberry silkworms because they are reared indoors. This is not feasible in case of non-mulberry culture, i.e., tasar rearing, because they are reared in the forests by the tribals. These worms are subject to periodical drought and humid conditions and are also subject to damage by pests and other predators. These result in higher mortality rate of the worms and lower cocoon production, creating a raw-material scarcity for handloom industry. This ecological constraint can be somewhat modified if scientific rearing houses are constructed for mulberry silkworms and indoor rearing for tasar worms are adopted on a commercial scale. With regard to tasar culture, non-availability of host plants like Asan, Arjun etc. is a major growth

constraint. Within the existing forest areas, more species of tasar host plants could be identified in the western regions where block plantation may be introduced to make it a viable proposition.

In case of mulberry cultivation, the fallow lands not particularly suitable for crop cultivation can be used for systematic mulberry cultivation, provided little investment is made on irrigation. Shortage of mulberry leaves is one of the constraints of silkworm rearing particularly in the western region. To remove the physical constraints, the remedial measures should be taken up taking into consideration the various factors of water resource and land resource management.

Water Management

Since irrigation becomes the major and foremost constraint to further extension of mulberry cultivation and increased production, a systematic management of both surface and ground water appears to be an urgent need of the day. In this context, mention may be made of river-lift irrigation system which has proved beneficial in certain parts of Nalhati P. S. in Birbhum district. This may be made available in other areas with a little initial investment. Cutting of canals from main streams may also prove useful for the purpose.

Storage of rain water in tanks during the rains can meet the requirements of irrigation water during the deficit months.

Tapping of ground water by digging tube-wells both shallow and deep, has proved beneficial at Bolpur Police Station in Birbhum district. These types of facilities accompanied by financial assistance should be provided in the drought prone areas of Bankura, where irrigation facilities are negligible.

Land Resource Management

In order to extend mulberry cultivation several factors have to be taken care of. Since it is a cash crop and stands in competition with other cash crops, the importance of extension programmes in mulberry cannot be underestimated. To overcome this situation, vast areas of uncultivated and cultivable waste lands in mulberry growing areas can be identified and may be gradually brought under mulberry farming. Interculture of mulberry with other crops like potato and soyabeans may prove beneficial in the drought prone areas. This will give a better yield of mulberry.

Economic Constraints

Within the broad spectrum of economic constraints, a range of factors need worth mentioning. This will be analysed in terms of vertical and

horizontal sectors of sericulture taking into account both sectoral and temporal phenomena.

The vertical sectors of production include the various stages of silk processing such as i) cultivation/rearing, ii) reeling, iii) weaving, and iv) manufacturing. While by horizontal sectors, it is meant, those processed commodities which are produced from each sector of production, are purchased by the different sectors for final processing and are, therefore, linked horizontally through an inter-related market system. Mulberry leaves produced from the farming sector are fed to the silkworms; thereby yielding commercial cocoons. These operations form the rearing sector of sericulture. In the next stage of processing the cocoons are reeled into silk yarn which comes within the purview of reeling sector and finally the fabrics are woven from the yarn which come within the weaving sector. At the final stage of processing, the dyeing and printing of fabrics are done within the manufacturing sector. This horizontal linkage of one sector of sericulture with another affects the cost structure of the ultimate products. Therefore, proper functioning of both horizontal and vertical sectors of production is essential for efficient production. Finally, the spatial location of these production sectors will be studied in a time-series, and it will be seen how far these factors act as growth constraints.

i) Agricultural Sector

The major growth constraints of the agricultural sector are : i) lack of fertilizers (chemical), ii) short supply of improved mulberry cuttings, iii) stiff competition with other cash crops like jute, sugarcane, potato etc., iv) insufficient supply of disease-free eggs for commercial rearing, v) lack of price stabilisation in trade and marketing, vi) the climatic hazards result in a crop loss and price fluctuation acts as a major deterrent forcing the cocoon rearers out of business, and vii) lack of storage facilities. If scientific storage facilities are provided, the green cocoons which are highly perishable can be properly dried and fit for storing till final disposal. This will have a far-reaching effect on the primary producers and bring a market stability.

ii) Semi-Industrial Cottage Sector or Reeling Sector

In order to have a stable growth in sericulture, a viable reeling sector is helpful as the supply of quality yarn falls short than the requirements of the weaving sector. In this respect, filature silk is able to cope with the problem of yarn supply better than the charkha silk. Because the quality of filature yarn is superior to that of charkha yarn. The latter is of uneven length and thickness and is of coarser quality. Yarns from charkha, therefore, appear to be unsuitable for weaving of finer fabrics. Although charkha silk yarn is cheaper than filature silk, yet for commercial expansion of sericulture, filature silk gives better performance because of its preference in overseas market. The charkha silk, however, can meet the needs of the domestic

consumers producing coarser variety of fabrics at a cheaper price. The success of Karnataka lies in the production of superior quality filature yarns. As long as the unfair competition between filature silk and charkha silk continues, the development of silk industry in West Bengal will be retarded. This problem has been emphasised by the experts from time to time and some constructive steps have been taken. Introduction of Ghosh and Roy machines, construction of State filature unit, are examples of such programmes. Unfortunately, the number of improved basins and filatures are indeed few to cope with the rising demand.

At this stage reeling sector needs modernisation with more and more power driven filature units. Unless emphasis is paid on the production of quality yarn, the future of silk industry is likely to remain shaky. Future development, therefore, depends largely on this sector.

In case of tasar industry too, reeling sector needs reorganisation. In spite of the earnest efforts of Central Tasar Research Station, almost the entire production of tasar yarn in West Bengal is of inferior quality, popularly known as 'Ghicha' silk.

iii) Weaving Sector

In weaving sector, there is an unequal competition between handloom and powerloom. The entire silk fabric production of West Bengal comes from handlooms while in Karnataka, J & K and other States there are a substantial number of powerlooms. Therefore, if West Bengal wants to create a strong economic base by producing fabrics at a competitive cost, she has to diversify her production lines.

In international market, the handloom silk products have a substantial demand. In this sector the major constraint is short supply of raw material at a reasonable price. Moreover, due to the deliberate policy of the Government, time and again the internal market is flooded with cheap imported Chinese yarns, of both mulberry and tasar, which seriously hamper the production of handloom sector creating an imbalance in the cost structure.

iv) Manufacturing Sector

This sector in West Bengal is highly disorganised. The majority of printing and dyeing units come within the purview of small-scale cottage industry. These units are managed by small entrepreneurs who are mostly job workers receiving orders and supplying them accordingly. This occasionally results in production of inferior quality fabrics. Moreover, this sector suffers from lack of product diversification, product modernisation, maintenance of standard and associated deficiencies. The number of large-scale mills are few, mostly located at Serampur in Hooghly district. Recently, the Khadi Commission has felt the need of co-ordination of various sectors of sericulture. It is planning to bring printing and dyeing units under

its management. This seems to be a viable proposition. Both the quality and price of the fabrics can be maintained if Khadi Commission takes up this venture.

Transport Bottlenecks

Inadequate transport linkage and primitive mode of transport are the major bottlenecks in the development of sericulture in West Bengal. In the villages, the primitive modes of transport are still in vogue. During the monsoon season, movement is difficult from producing centres to the market due to bad shape of the roads. Therefore, silk weaving centres remain inaccessible for a considerable part of the year. The weavers consequently have insufficient knowledge of the market which results in reliance on the middlemen both for the supply of raw materials and marketing of the finished products. As a result the local weavers are ignorant of the prevailing wage rate, market price or any fluctuations in market price.

Lack of Marketing Facilities

The silk manufacturers are mostly dependent on private traders for the sale of their products. In recent years several government owned units like 'Handloom and Powerloom Development Corporation', Co-operative Institutions and the 'Khadi Commission' have come forward for marketing. But the distribution system is far from organised. This is one of the major growth constraints hindering the development of this industry in West Bengal.

Socio-Cultural Factors

Social customs, conventions and family heritage affect the rural occupation structure in general and sericulture in particular. There is a general apathy to improved techniques of cultivation, rearing etc. The institutional factor acts as a barrier for growth in the rural areas. The operation of non-institutional finance and lack of institutional finance, creates a vicious circle and increasing dependency on the middlemen (locally known as Sowcars/Mahajans) for their livelihood. This factor needs further elaboration. It has been mentioned earlier that in the handloom sector, the industry is largely in the hands of private merchants at a monopoly price (Vide Chapters V & VI). The consumer price of a piece of fabric (5.5 m. length) at present ranges between Rs.170 - Rs.175/-, the producer's cost of which does not exceed Rs.90-Rs.100/-. The difference is the disguised cost, being the share of profit of the middleman. Under the present system, it is extremely difficult to purchase silk yarn from the open market because bulk of the product is in possession of the dealer (middleman) who purchases the stock well in advance at an arbitrary rate. The individual has the liberty of not to sell his commodity to the Mahajan at his terms. But he is faced with the risk of losing his next contract for the coming season. Therefore, more often than not, individual reelers outside the co-operatives,

sell their products to the merchant/dealer at a much lower rate than the market. This practice is still in vogue in the silk market of West Bengal, whereby the parasitic class gets the maximum benefit, thereby depriving the rural artisans/craftsmen. This is the first and foremost growth constraint standing in the way of development of the industry. In the rural economy, the rate of capital formation is indeed low. It is even lower in investment into the industry. The marginal productivity of labour appears to be negligible. Under such a system, the only alternative is to organise the distribution of credit through industrial finance rather than increase the quantum of savings. But it requires large-scale mobilisation of resource from all quarters and the task cannot be completed merely with the help of commercial bank alone. Co-operation from other sectors appears to be a helpful proposition.

Under the mixed economy, a combination of laissez-faire attitude together with co-operative system of economic organisation, have created a dichotomy between the private sector and organised sector. This dual concept of rural economic rehabilitation has a direct confrontation with the development of cottage industry. The system of 'intermediaries' could not be curtailed even after 34 years of independence. These economically parasitic class are thriving financially at the expense of primary producers and ultimate consumers. It is, however, advisable to achieve a hierarchical pattern in rehabilitating the small entrepreneurs under different types of co-operatives. At the same time greater number of financially weaker silkworm rearers, reelers and weavers should be protected by bringing them under some bigger co-operative organisations. Institutional finance should be made available in greater amount. The malpractices of traders as well as exporters have resulted in creation of a private monopoly in the silk market. This has a double-effect on the economy. On the one hand the traders maintain a high profit margin by increasing the price, often at the cost of quality. On the other hand, the wage- weavers are becoming poorer day by day, because of the high cost of raw-materials and increasing costs of manufacturing. The wage rate is, therefore, kept at the sub-marginal level to meet the inflationary situation.

All these factors act as constraints inhibiting healthy growth of sericulture in West Bengal.

Spatial Disintegration

Sericulture in West Bengal is functionally disintegrated in space. Each sector of the industry has developed in a particular unit of space because of ecological-cum-cultural conditions existing for centuries. But they have now become uneconomic scale of operations. The transit and other production costs arising out of disaggregation of inter-connected sectors of sericulture have created regional imbalances in growth and development.

Future strategy, therefore should be focused to delineate new regions with co-ordinated and organised sectors so that economies of scale can be harmonised.

In the temporal context, a polarisation of economy is sighted in the handloom sector. A few traders at the top of the hierarchy control both the domestic and international market, while a large number of cultivators, rearers, wage-reelers, wage-weavers, printers, job workers etc. form the broad base of the rural-urban economy. Thus the imbalance in the regional economy has snow-balled to a stupendous proportion with the passing of time. The gap between the higher and the lower hierarchy instead of being narrowed is becoming wider.

Outlook

In order to remove the existing growth constraints, certain measures should be adopted.

These are as follows :-

- i) The first step in this direction would be minimisation of cost of production thereby ensuring the earnings of the primary producers ;
- ii) eradication of middlemen would be another big step in securing the base of the industry. This can be effectively implemented through organisation of raw-material banks and 'sales emporiums'. These measures can be adopted only through administrative help. Unless the Government takes sufficient interests in safeguarding the interests of the rural workers, the problems will not be solved.

Therefore, adoption of realistic planning programmes by the Government will ensure the future of sericulture in the state.

CHAPTER IX

REGIONAL ANALYSIS : CASE STUDIES

Introduction

The regional analysis of various parts of the State where sericulture is practised both of mulberry as well as non- mulberry sector may be of further insight to understand the diversities of farming and productive organisations and how far these are controlled by ecological and economic co-variants. With a view to achieving these objectives intensive field studies have been conducted in selected regions covering the tracts where sericulture is practised in the State. Some of these regions are noted for farming operations and rearing cocoons as in case of Malda. There are other areas where farming operations are not of much importance but there is a well-established organisation in reeling and weaving, that is, in different aspects of manufacturing processes. Murshidabad may be said to be an example of this type. Some areas possess viabilities of mulberry production as well as prospects of setting up silk factories. But development still now remains at an embryonic stage. Birbhum belongs to this type. Amongst the non-traditional areas of silk culture, some areas are noted for the production of both mulberry and non-mulberry silk. But compared to other areas, growth prospects still remain low, although the region possesses viabilities. Bankura is a typical example where sericulture had a firm base but due to changing socio-economic environment, the base has become weakened in recent years. In the non-mulberry sector, Purulia holds good promise in tasar culture though the region has not shown particular development because of lacuna in planning.

The northern districts, Jalpaiguri and Darjeeling are carrying on experiments in sericulture. Only in recent years, indicating viabilities in the bright prospects of growth. With the initiation of Lutheran World Service the ericulture of Jalpaiguri is being revived particularly in Madarihat.

Darjeeling, because of its congenial climate, has been selected in propagating mulberry of improved strains and bi- voltine varieties of cocoons with higher yield. The results of these experiments are yet to be assessed. The various facets of mechanisms of production in these selected areas have been studied in considerable detail. Case studies, accordingly, have been made in the following areas :-

- Mulberry Sector
- i) Malda - a typical mulberry growing, cocoon rearing and silk-reeling area.
 - ii) Murshidabad - a predominantly silk-weaving centre.
 - iii) Birbhum - a non-traditional area of integrated sericulture.

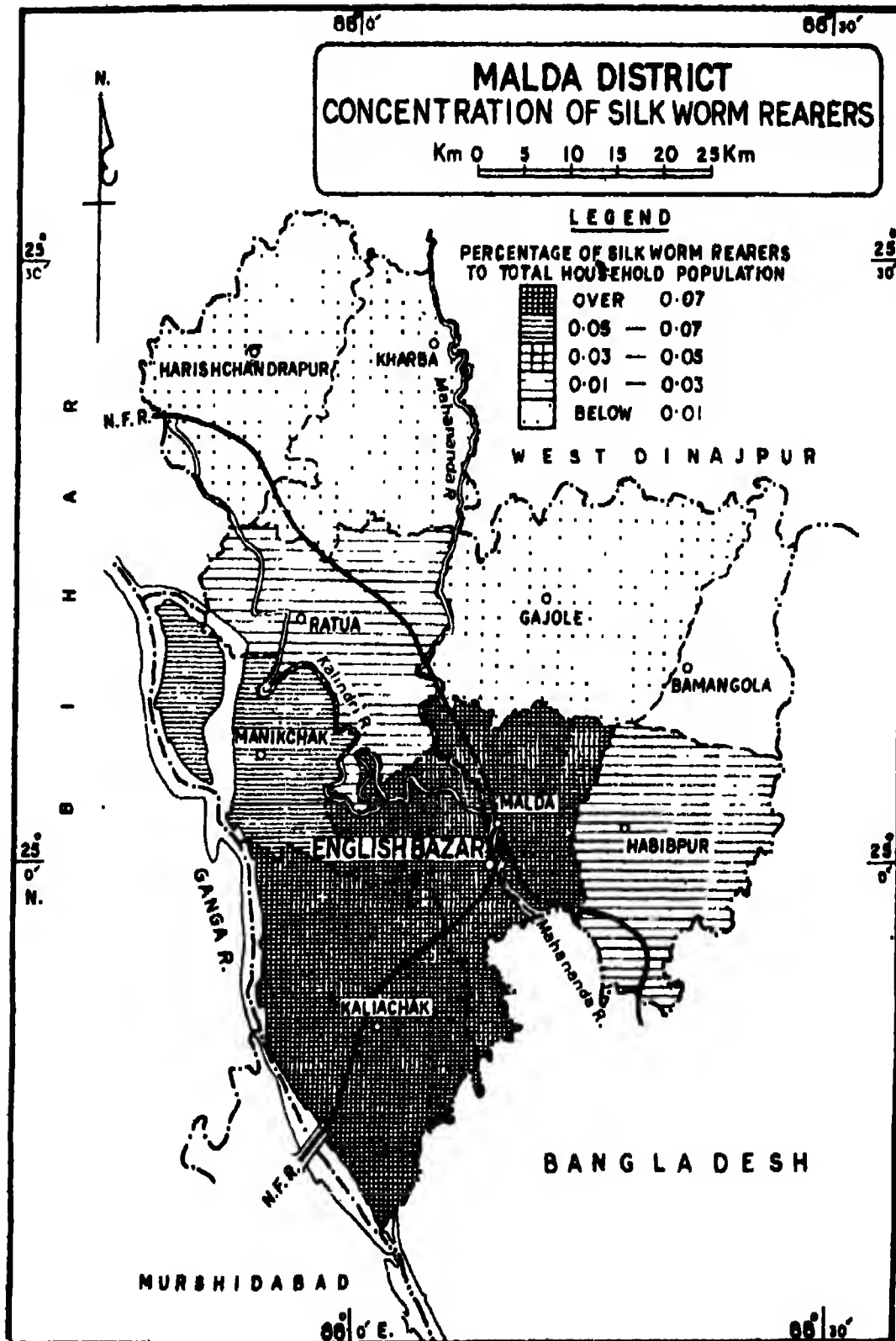


Fig. 11

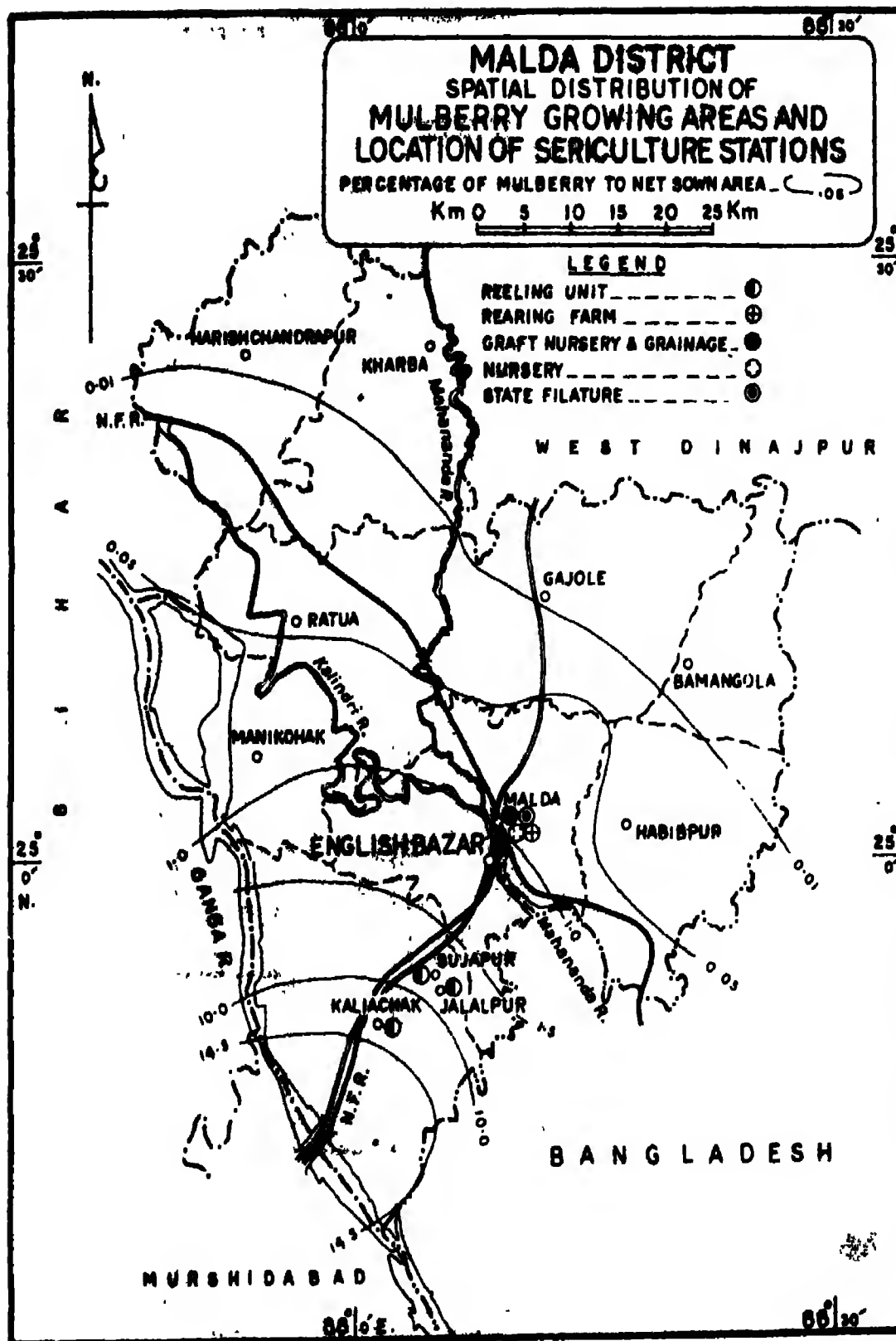


Fig. 12

iv) Bankura - -do-.

Transitional

Sector - v) Darjeeling - a potential area of new experiments in mulberry culture and silkworm rearing.

Non-mulberry

Sector - vi) Jalpaiguri - a centre for the revival of eri silk.

vii) Purulia - a typical centre of tasar silk.

i) Malda - Typical Mulberry Growing, Cocoon Rearing and Silk-Reeling Area

Malda holds a very important position in sericulture in West Bengal, supplying 90% of mulberry leaves of the State. An area of about 6,530 hectares of land is devoted to mulberry cultivation. Ideal geographical environment together with traditional skill of the people in the art of silk reeling has enabled Malda to acquire celebrity in silk trade since very early days.

History of Sericulture in Malda

Malda has specialised in the art of silk rearing and reeling since early days. Even during the medieval period, Malda became famous in silk-weaving, particularly in the weaving of matka and garod fabrics. The weavers were said to be concentrated in and around English Bazar P.S. Manufacturing of silk yarn on a commercial scale was started in Malda after the inception of the British East India Company during the late 17th century. During the middle of the 18th century, filature system was introduced by the help of a Frenchman and the first silk factory was built at Singatola. In 1770, a silk factory was established at English Bazar. International trade in silk goods was initiated thereafter in 1790. The silk industry suffered various set-backs in early 19th century and the industry showed positive signs of decline despite the support and assistance of the Government. During this period, there was a diversion in silk trade and a domestic market for indigenous silk yarn (viz., Khamru) was developed, while filature and waste silk yarns were mainly exported till such time when the technique of yarn production from waste silk was unknown in Europe (District Gazetteer Malda, 1918). The export market also declined thereafter, because of unequal competition between the European and Indian silks. After independence, however, there has been a thorough change in the development strategy of sericulture in West Bengal. The State Government has become interested in revitalising the industry on more prospective lines. Emphasis is given on improving the rearing conditions of silkworms and to resort to a commercial production of cocoons, so as to enable production of quality yarns mainly for domestic consumption. In the process, Malda gradually loses her market for woven fabrics.

Murshidabad has emerged as an important weaving centre. Malda continues to function as the sole market of silk yarn particularly of filature silk which is presently localised in and around Kaliachak P.S.

Socio-Economic Attributes

In Malda sericulture is regionally concentrated in the three police stations, viz., principally at Kaliachak and partially at English Bazar Manickchak (Vide Fig. 11).

The maximum concentration of rearers occurs at Kaliachak, being followed by English Bazar, Manickchak and Malda.

Table 9.1

Concentration of silkworm rearers in Malda, 1979

Name of P.S.	Total No. Households	Households as percentage to district total	No. of rearer's family	Families percentage to total rearer's family	Ratio between the rearer's family to total households
Kalia-chak	56,715	20.92	28,231	90.62	4.33
Manick-chak	20,386	7.52	145	0.46	0.06
English Bazar	31,261	11.53	2,408	7.73	0.67
Malda	11,350	4.18	145	0.46	0.11
Habib-pur	21,198	7.82	71	0.22	0.02
Gajole	25,112	9.26	20	0.06	0.006
Ratua	30,429	11.22	96	0.30	0.02
Harish-chandra-pur	33,837	12.48	3	0.009	0.007
Bama-ngola	12,569	4.63	Nil	Nil	Nil
Kharba	28,178	10.39	31	0.09	0.008

(Source : Directorate of Sericulture and Silk-Weaving, Malda, 1979).

The number of rearers tends to decrease gradually towards the north. It may be of interest to note that such a localisation is not entirely due to

ecological or economic factors, but to socio-cultural attributes of the people. The population density of the district has played an extremely vital role in this respect. The population of Kaliachak and English Bazar P.S. are dominated by the Muslims and lower caste Hindus, i.e., 'Pundra- Kshatriyas'. These areas are more densely populated than others. Sericulture which involves rearing of worms and subsequent treatment of the cocoons for reeling purposes, has become the avocation of these people. Such an occupation is not generally preferred by the high caste Hindus till present. Therefore, the art of rearing cocoons and reeling silk threads from them have been confined within these sections of rural population. The system is then passed on to the younger generations over the years. Thus the people have acquired a high degree of specialisation. Therefore, socio-economic attributes exert a strong influence in the regional pattern of the industry in Malda.

Ecological Factors

Of the ecological variants, climate plays an important role in determining the rearing and reeling operations. The silkworms prefer moderate temperature and humidity for healthy growth. The average temperature should be less than 23.8°C and humidity below 70% at the spinning time. However, the room temperatures are to be adjusted to this requirement as much as practicable. Malda has an average annual rainfall of 1500 mm. and humidity remains high throughout the year. During the summer months, the temperature rises over 30°C but in winter it comes down to 18°C (Vide Fig. 2). Therefore barring the summer months and monsoon period, the cocoons can be effectively reared for the rest of the year. The cocoons reared during the summer monsoon months give a lower yield.

Nature of Crop

In Malda district, four commercial crops are usually harvested, viz., 1) March-April, 2) May-June, 3) August-September, and 4) November-December.

Soil Condition

Mulberry is a hardy crop and can be grown under any soil conditions. However, sandy loam soil is found to be ideal for mulberry cultivation. Three types of soil, viz., a) loam, b) sandy loam, and c) clayey loam are found in Malda district. The soils of Kaliachak P.S. are of sandy loam variety having a pH value of 6.8.

Terrain Pattern

The mulberry requires slightly high lands because the plants cannot withstand waterlogging conditions. Therefore well-drained land surface is ideal for its culture.

In Malda district, mulberry fields are located mostly on 'diara' lands, which are slightly raised alluvium surface lying south of the Kalindri river. These lands are exclusively devoted to mulberry culture throughout the year.

Thus Malda possesses the necessary environmental pre-requisites for mulberry culture and silkworm rearing, namely presence of sandy loams, dense population and presence of a well-knit agrarian economy well suited to its culture. Moreover, mulberry culture and silkworm rearing ensure better cash returns to the growers. The climate, however, is not congenial for its culture throughout the year.

Methods of Cultivation

In Malda, mulberry bushes are planted in rows, which are popularly termed as 'bush type of plantation'. Under this system, the yield of mulberry leaves is high, although the quality is inferior to the tree type of plantation. At the same time, the cost of cultivation tends to be higher under the bush system than mulberry trees, as the maintenance of land under cultivation requires good deal of capital investment at the initial stage. The **Morus indica** variety of mulberry is planted here, though in recent years this traditional variety is being replaced by better strains, which give higher yield under the cover of irrigation.

The size of average holding is less than a hectare which is considered uneconomic for farm operations. The cultivator does not enjoy irrigation facility. As such, the crop is often damaged in summer when usually there is an acute shortage of water. The farmers use organic manures but now chemical fertilizers are also applied in the field, at the rate of about 570 Kg. per hectare.

Spatial Distribution of Mulberry

The mulberry area is highly concentrated towards the south and reaches its maximum at Kaliachak P.S. In the south, ecological conditions, like high humidity, sandy alluvial soil, and slightly elevated gently sloping lands are ideal for mulberry culture. Towards the southern part of the district mulberry cultivation increases particularly due to annual inundation of the area during the Ganga floods. The flood water is rich in lime and make the soil rich in it, which is preferred by mulberry. After the completion of Farakka Barrage the natural flushing of the area is restricted, the soil is getting little nutrient and as such there has been a decrease in mulberry production. In recent years there has been a tendency of decentralisation of mulberry culture and cocoon rearing towards the northern part of the district, with the help of government assistance (Vide Fig. 12).

Table 9.2

Percentage distribution of mulberry to net sown area in Malda District, 1979,

Name of the Police Stations	Percentage of mulberry to net sown area
Kaliachak	14.11
Manickchak	0.18
English Bazar	2.76
Malda	0.49
Habibpur	0.03
Gajole	0.01
Ratua	0.04
Harishchandrapur	0.002
Bamangola	—
Kharba	—

(Source : Directorate of Sericulture and Silk-weaving, Malda, 1979).

A Case Study of Anjamtala Village

This is a traditional mulberry-cum-cocoon rearing village, where cocoons are reared for seed preservation. Approximately 30 families are engaged in cocoon rearing in this village. Rearing is carried on in the traditional method as in other villages of the state. The farmer usually devotes a part of his dwelling for rearing purpose. The culture room of cocoons is usually high-roofed and it is protected from external heat by bamboo walls and some times by 'Khaskhash' which is occasionally sprinkled with water. There is usually one rearing rack in a room with 16 bamboo trays containing approximately 300 eggs. For each rack, about 800 Kg. of mulberry leaves are necessary for rearing. In this region there is a menace of flypest, viz. uzi fly or *Tricholyga bombycis* which are very harmful for cocoons. To overcome this problem, disinfectants are applied without appreciable success. As a precaution to this flypest menace, the rearers usually keep the windows secured with net covering. However, this arrangement is not adequate. There are frequent incidents of crop failure due to prolonged drought conditions. In the absence of any scientific equipments like air cooler, exhaust fans etc. the rearer has no other alternative but to face crop loss from such hazards.

Advanced Method of Rearing

The advanced method of cocoon rearing is usually practised in government nurseries or farms. In Malda, there is one such nursery at Piasbari which supplies disease-free layings to the commercial rearers. There

are five rearing houses within this nursery. The nursery covers about 23 hectares of land, of which about 8.40 hectares of land are devoted to mulberry. The average production of cocoons is 5,500 Kg. per year. Tank irrigation is prevalent here. In the advanced method of rearing, special care is taken to protect the quality of cocoons.

The rooms are high and are thatched with straw. The walls are thickly plastered with mud, with a coating of about 0.5 m. thick. This has moderating influence on the temperature. Water is also regularly sprayed on the walls. The room is provided with exhaust fan. During the winter months room heaters are used. The rearing chambers are usually equipped with hygrometer and thermometer. In the government owned graft nursery and grainage, experiments are being carried out to evolve new strains of mulberry. Four varieties of mulberry namely S-799, S-1, S-726, and C-776 are cultivated with the help of irrigation and fertilizer. An improved heat resistant variety of cocoon is evolved here. The silk laying ratio of this variety is more than the indigenous 'nistari' variety. However, these improved strains are now being distributed to the rearers in a limited scale. The average productivity level of cocoons is low but the process depends on factors other than the number of rearers. However, an attempt has been made to work out a correlation co-efficient ratio of silkworm rearers of this district in relation to production of cocoons (vide Table 9.3).

Table 9.3

Efficiency ratio of cocoon rearers in Malda District, 1979

Name of p.s. and Block	X	Y
	Cocoon rearer's family	Production of cocoons (Kg.)
Kaliachak I	21,028	2,967,200
-do- II	5,624	797,400
-do- III	1,579	185,760
English Bazar	2,408	212,200
Manickchak	145	32,400
Ratua I	35	4,680
-do- II	61	7,200
Gajole	20	3,600
Harishchandrapur	3	3,700
Habibpur	71	10,800
Old Malda	145	16,200
Kharba I	8	1,800
-do- II	23	2,502

(Source : Directorate of Sericulture and Silk Weaving, Malda).

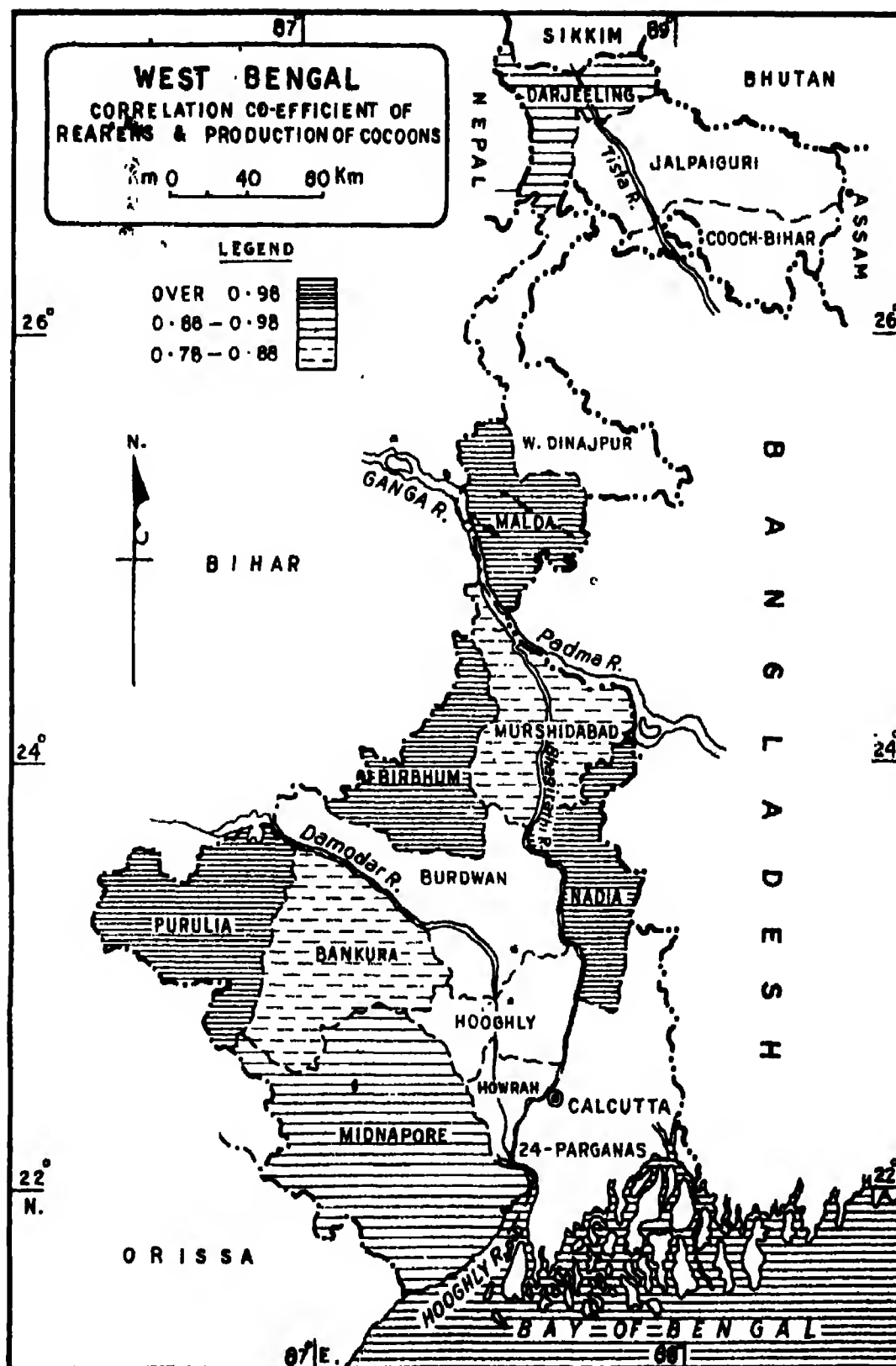


Fig-13

The correlation co-efficient 'r' between these two variables show a very high degree of correlation amounting to +0.99. This proves that with the increase in the number of rearers families in each police station of Malda, the production of cocoons increases. It may also be pointed out that the efficiency of rearers is also very high in this district. Notwithstanding certain constraints, the production is high due to ingenuity and skill of the rearers. (Vide Fig. 13).

Silkworm Reeling

Malda is noted for silkworm reeling, which is regionally concentrated at Jalalpur in Kaliachak P.S. Reeling is done both in the country basin or by the traditional charkhas at the homes of the reelers. In places, an improved basin (Ghosh Machine and Roy Machine) has been installed by the co-operative societies within the organised sector.

Methods of Reeling Charkha Basin (Katghai) : At the reeler's cottage, a charkha is made of brick and cement which is operated with the help of a wooden rotating wheel. The cocoons are first boiled in water and then reeled. Two persons are required in this process, i.e. one feeder and the other turner. The daily wage rate of the reelers is fixed at Rs. 12.00 per basin. The charkha or country basin can produce 500 gms. of yarn in 8 hours shift per day for which about 2.2 Kg. of cocoons are required.

This production rate, however, is subject to variations in case of private reeling depending on the length of working hours, availability of cocoon etc. Quite often, the production falls short of the above rate.

Improved Basin : The improved basins have 5 units, hence the production is faster. Here reeling is done twice by the transfer of the yarns from smaller units to big wheeling frames with a view to increasing the strength of the silk thread. The machines are used for reeling cocoons of high yielding varieties and consequently the yarn is of uniform thickness and of continuous filament length. At Jalalpur, about 50% of the reeling units are under the operation of the Khadi commission, where both the processes are practised.

In one of the major Khadi institutions known as 'Shri Gandhi Ashram' approximately 3,539 persons are employed.

Filature Basin : The third and the most scientific method of reeling is done by filature basins. The filature silk is superior in quality. In Malda there is one filature basin, located at Madhughat, near Malda town. This is a state-owned filature, the only one of its kind in West Bengal. In this filature only bi-voltine cocoons are reeled, but because of shortage of supply,

other hybrid and even indigenous cocoons are used. The purchase price of cocoons usually varies from season to season. At the time of survey, the price of bi-voltine and nistary cocoons were Rs.285.00 and Rs.255.00 per Kg. respectively.

Reeling Processes

The initial reeling process involves three stages, namely a) steam-blasting, b) hot air oven-drying, and c) sun-drying by which the worms are first killed. In filature, steam-blasting is not in vogue because of high percentage of humidity in the atmosphere which hampers the drying process of the cocoons. Therefore only sun-drying is practised here. The cocoons are then sorted and divided into batches according to their weight for commercial purpose. For actual reeling, there is a cooking system which involves three different treatments under different temperatures. The first and the third treatments are given at 60-65 °c while the second treatment is given under a temperature of 90-95 °c. Heat is given from below in the form of steam. Heating is required to eliminate the gummy substance of the silkworms. After the cocoons are dipped through different pans, the heating process is finished by showering cold water.

Composition : In the filature system, there are 100 basins of which 60 are in working condition. The speed of the reel is 90 RPM (rotation per minute). In case of indigenous and inferior quality cocoons, it can, however, be increased upto 120 RPM.

Reeling is followed by re-reeling to check minor defects and standardise the hanks. This is done at a high speed of about 300 RPM. This process is followed by arranging the silkyarn into books, each book having 30 hanks. There are about 6 hanks in each row, each book having 5 rows of hanks.

Production : The optimum production of the filature is about 800 to 850 gms. of good quality silk-yarn per day. But during the time of survey the average production was only 400-450 gms. per day because of shortage of quality cocoons and labour unrest.

Problems :

The State filature of the district is presently being confronted with certain problems, like :—

- i) lack of supply of quality cocoons,
- ii) non-utilisation of full 8 hours shift which reduces the production efficiency,
- iii) lack of distinction between skilled and unskilled reelers,

- iv) provision of full employment despite the nature of crop harvest, and
- v) natural constraint of climate like excess humidity or droughts.

Table 9.4

Employment structure and wage rate of the employees at Madhughat Filature, Malda, 1979

Categories of workers	Persons engaged (in numbers)	Daily wage rate (Rs./day)
Reelers	60	9.50
Re-reelers	7	8.50
Master reelers	8	9.50
Re-reeling Master	1	8.50
*Katghai reelers	1	8.25
Cooking man	3	8.00
Batch carriers	4	8.50
Machine man	1	8.00
Silk-waste cleaners	3	8.00
Outside labourers	4	9.25
Fire man	1	8.00
Sweeper	1	8.00
Night guard	2	8.00
Manager	1	Fixed salary per month.
Asst. Manager	1	
Demonstrator	1	
Accountant	1	
Clerks	4	
Others	21	

(Source : Madhughat State Filature, Malda)

*country basin.

It should be mentioned here, that after reeling both by country or improved method as well as by filature a large amount of silk waste is produced. The waste is actually the inferior quality yarn which is spun either by spinning wheel or by spindle machines and turned into another category of silk thread commonly called 'jhute'. The average production of silk waste hanks (arrangement of silk yarns into twisted knots) is 2. A weaving wage of Re.1.60 is given to the reelers per hank produced.

From large number of pierced cocoons, a special category of silk yarn is produced. This is called 'matka' which is of inferior quality because of discontinuous filament length, but the fabrics produced out of this yarn commands a big domestic market. The wage rate per hank of matka yarn produced is Rs. 1.50.

Silk Weaving

It has already been mentioned earlier that weaving is not practised at Malda. However, there is a Central Government organisation at Malda, known as 'RIC' Unit where weaving is carried on a limited scale. Three types of weaving machines are in operation here, for example 1) semi-automatic Chittaranjan loom - 9, 2) fly-shuttle loom - 20 (handloom), and 3) semi-automatic Benaras loom - 10.

On an average, 11 m. of fabrics can be weaved in 1.5 days. The existing market price of 11 m. of silk fabrics is Rs. 240.00.

Employment

The total number of artisans employed in this unit is 81 and 23 persons are employed in other sectors of this particular avocation. Their wage rate is fixed on piece rate basis. The employees get benefits and facilities as per other factory workers.

This factory gets yarn from Madhughat at the rate of Rs. 290.00/Kg. in case of nistari and Rs. 330.00/Kg. in case of bi-voltine silk worms. The installed number of machines are 74, out of which only 39 are now in working condition. The production of this unit is hampered due to uncertain supply of finance, lack of proper maintenance and labour trouble.

Marketing

The finished fabrics are sent to Calcutta for bleaching and dyeing. Only the 'garod' variety of sarees are bleached and dyed here.

Problems of Sericulture in Malda

After a careful analysis of various geographic and socio-economic factors of sericulture in this district, it becomes apparent that Malda is now facing the problems of intricate market mechanism under a complicated economic system with trade monopolism at its apex. The entire mode of production is geared up in such a way, so as to feed this monopolistic trade group, whose principal motive is to derive maximum benefit out of primary producer's labour. In the absence of credit facilities the individual rearer/reeler has to depend on the credit mobiliser, in this case mostly master rearer/master reelers who are consequently big yarn traders. Most of the wage labourers are employed on daily wage rate and thus the entire

yarn produced is expropriated by them. In the absence of a fixed market price of cocoon, the yarn price also suffers fluctuations from season to season, affecting the daily wage reelers as well as small rearers adversely. About 70% of the industry is under the private sector. Over and above, there are natural constraints of adverse climate particularly that of high temperature and high humidity, and production constraints of inadequate supply of mulberry cuttings, disease-free layings, lack of irrigation facilities etc.

In the reeling sector, production efficiency can be energised with the installation of more improved basins. The reelers should be brought under the organised sector in increasing numbers. Attention should be given on the quality of yarn production.

The administrative problems need to be sorted out, otherwise the industry will continue to suffer from various maladies. An integration of the entire industry both sectoral and spatial might solve some of the problems. This could be achieved by establishing co-operative societies in the different sectors of the industry. Furthermore, disposal of filature silk has posed a problem due to absence of weaving arrangement in Public Sector as well as dependence upon the merchants for disposal of the filature yarn. The establishment of a weaving factory with power looms and Benaras looms can solve this problem.

In recent years, however, the government has taken initiative to revive the industry through 'Bank Finance Scheme, Pilot Projects' etc. The new 'Chawki' system of rearing has been introduced at Jalalpur which has proved beneficial. A number of traditional farmers are now being trained by experts and demonstrators for improved rearing. The extreme localisation of the industry may necessitate some decentralisation. There is already a tendency of decentralisation towards the northern regions of Malda district in recent years. It can therefore be concluded that sericulture is becoming more and more popular here because of its economic viability. If the industry is properly organised, the future appears to be more bright and prosperous than the present.

ii) Murshidabad - A Predominantly Silk-Weaving Centre

Introduction

The district is traditionally famous for silk-weaving and can be termed as the silk-centre of West Bengal. Although the printing and dyeing processes are mainly carried at Serampur in Hooghly district, Murshidabad enjoys the privilege of having the expertise and skill for silk-weaving for

centuries. The modern silk factory was first established by the British East India Company at Coussimbazer in 1658, taking advantage of the various locational advantages of the district. In this way, commercial production of silk fabrics on a factory scale was initiated here for the first time in Bengal. Subsequently Jangipur became an important centre in 1773. Of the various factors that have led to the concentration of silk-weaving industry here, the most important is the accessibility to the market. The district is well connected with Calcutta through the Bhagirathi-Hooghly river which was the most important transport artery of the region during the early 18th and 19th century. Availability of reeled yarn from Malda may be said to be another favourable factor. Though rich in raw material, i.e., silk-yarn, Malda was never interested in silk-weaving because of its distance from the chief marketing centre in Calcutta.

Since the later years of the 19th century, the eastward shift of the Bhagirathi-Hooghly system has resulted in the gradual deterioration of this navigable river channel. At present it is not possible for big steamers to ply through the river near Murshidabad. But even as late as the middle of the 19th century, Murshidabad was open to ocean going vessels by the river. Along with this, several other geo-economic factors were responsible for the prosperity and decay of silk industry at Murshidabad during the past few decades. The industry, however, has regained its stability after the independence, largely due to the earnest efforts of the State Government.

An indepth study was made in the district to bring out the various characteristics of her silk-weaving, the reasons for its localisation and the wage structure of the weavers which have important bearings on the economy of production and future viability of this industry in and around Murshidabad.

Geographical Environment

The climate of Murshidabad district is hot and humid somewhat similar to that of Malda. High temperatures prevail for about 8 months of the year and high humidity is a year-long phenomenon (Vide Fig. 2). Such a climate is suitable for the rearing of only multi-voltine or *Bombyx craesi* or 'nistari' variety of cocoons. The soils are more or less suitable for mulberry culture, the pH value of the soils being 7.0. Despite such advantages it is interesting to note that silk-worm rearing on a commercial scale has not become an important occupation of the people in Murshidabad District. Silk-worms are usually reared here for seed preservation and about 70% of the production of cocoons of this district are diverted to Malda as seed. Therefore, it is difficult to identify any regional concentration of mulberry plantation in the district. Systematic plantation has, however, been recently

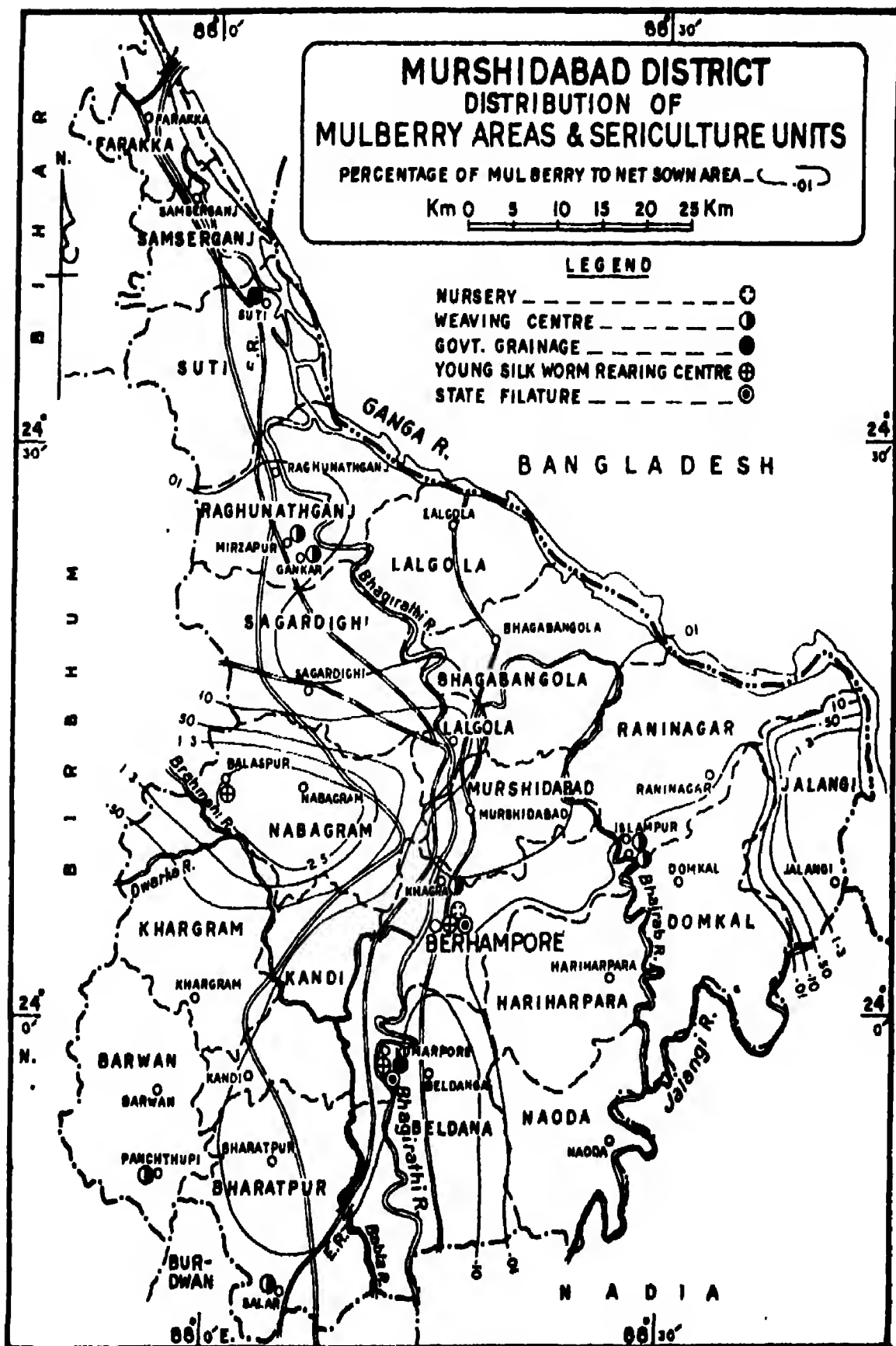


Fig. 14.

introduced by the State Government in the northern and north-eastern part of the district lying along the Padma flood-plain notably at Sagarpara. Mulberry fields are located mostly on the river levees and on raised lands in the villages because the plants do not prefer water-logging conditions. Like Malda, bush type of mulberry is also raised in Murshidabad.

Spatial Distribution of Mulberry

The Spatial Distribution of mulberry lands in Murshidabad records its regional concentration at Nabagram and Jalangi P. S. Cultivation in other parts of the district is relatively sparse and insignificant. The western part of the Bhagirathi river has higher concentration of mulberry. In its eastern part, mulberry culture is concentrated only at Jalangi interfluvial region. Such low concentration in the eastern part may be due to the general low-lying nature of the terrain susceptible to flooding. The western part being high in elevation and having a dry climate is ideal for mulberry culture. Hence mulberry prefers the western bank of the river (Vide Fig. 14).

Although mulberry covers an insignificant proportion of the net sown area of the district, Murshidabad district is famous for seed production. Silk-worms are reared here for seed preservation and are supplied to other commercial rearing zones of the State.

Table 9.5

Percentage of mulberry to net sown area in Murshidabad District, 1980			
Name of the P. S.	Net sown area (in ha.)	Area under mul- berry (in ha.)	Percentage of mulberry to net sown area
Raghunathganj	20013.74	5.99	0.02
Sagardighi	27214.98	1.79	0.006
Lalgola	13933.85	0.93	0.006
Raninagar	25022.71	4.80	0.01
Jiaganj	5424.71	14.96	0.27
Nabagram	22176.49	569.82	2.56
Khargram	107712.74	371.32	0.34
Burwan	62199.87	12.86	0.02
Kandi	55102.77	6.41	0.01
Bharatpur	29296.55	3.85	0.01
Beldanga	41897.49	85.63	0.20
Berhampore	54532.87	10.62	0.01
Jalangi	9427.54	148.09	1.57

(Source : Directorate of Sericulture and Silk-Weaving, Berhampore).

Mulberry cultivation and silkworm rearing are carried out in this district as a subsidiary occupation of the people. The per hectare productivity of mulberry leaves in the district is about 14,000 Kg., which is lower than Malda (18,000 Kg.).

Table 9.6

Growth of mulberry areas in Murshidabad

Name of P.S./BL	(in ha)				
	1978-79	1979-80	1980-81	1981-82	1982-83
Nabagram	528.78	562.87	583.12	603.37	623.62
Khargram	317.28	366.79	387.04	407.29	427.54
Burwan	79.46	12.70	13.11	13.72	13.92
Kandi	5.93	6.33	6.74	7.14	7.55
Beldanga	80.54	84.59	88.64	92.69	96.74
Bharatpur I	3.80	3.80	4.21	4.61	5.02
Jiaganj	6.68	14.78	22.88	30.98	39.08
Raghunathganj	5.11	5.92	6.33	6.73	7.14
Berhampore	5.27	10.49	15.75	21.02	26.28
Jalangi	129.28	146.29	166.54	186.74	207.04
Raninagar II	2.98	4.74	N.A	N.A	N.A

(Source : Directorate of Sericulture and Silk-Weaving, Berhampore, 1980).

Mulberry Areas in Relation to Other Cash Crops

The region has suffered various set-backs after the World War II, as a result of which the production of mulberry leaves as well as cocoons recorded decline as there is a close relationship between mulberry culture and silkworm rearing.

Mulberry areas declined due to emphasis paid on jute cultivation on mulberry lands because of high profitability of the latter. Moreover, the demand of jute increased suddenly after the partition. Incidentally, it may be mentioned in this connection that the market of cocoon is not so much dependent on local conditions but on fluctuations in international demand. All these temporarily led to the decline of mulberry areas. But after independence, the production of mulberry leaves and cocoons received a new impetus because of government policies. Even then the efforts have not become fully realistic because mulberry has to compete with high yielding variety of rice which are being grown on high lands under irrigation. However, there are certain economic advantages of sericulture over other crops which have enabled it to sustain in the face of such multiple constraints. In this context, a cost benefit analysis has been worked out for rice and

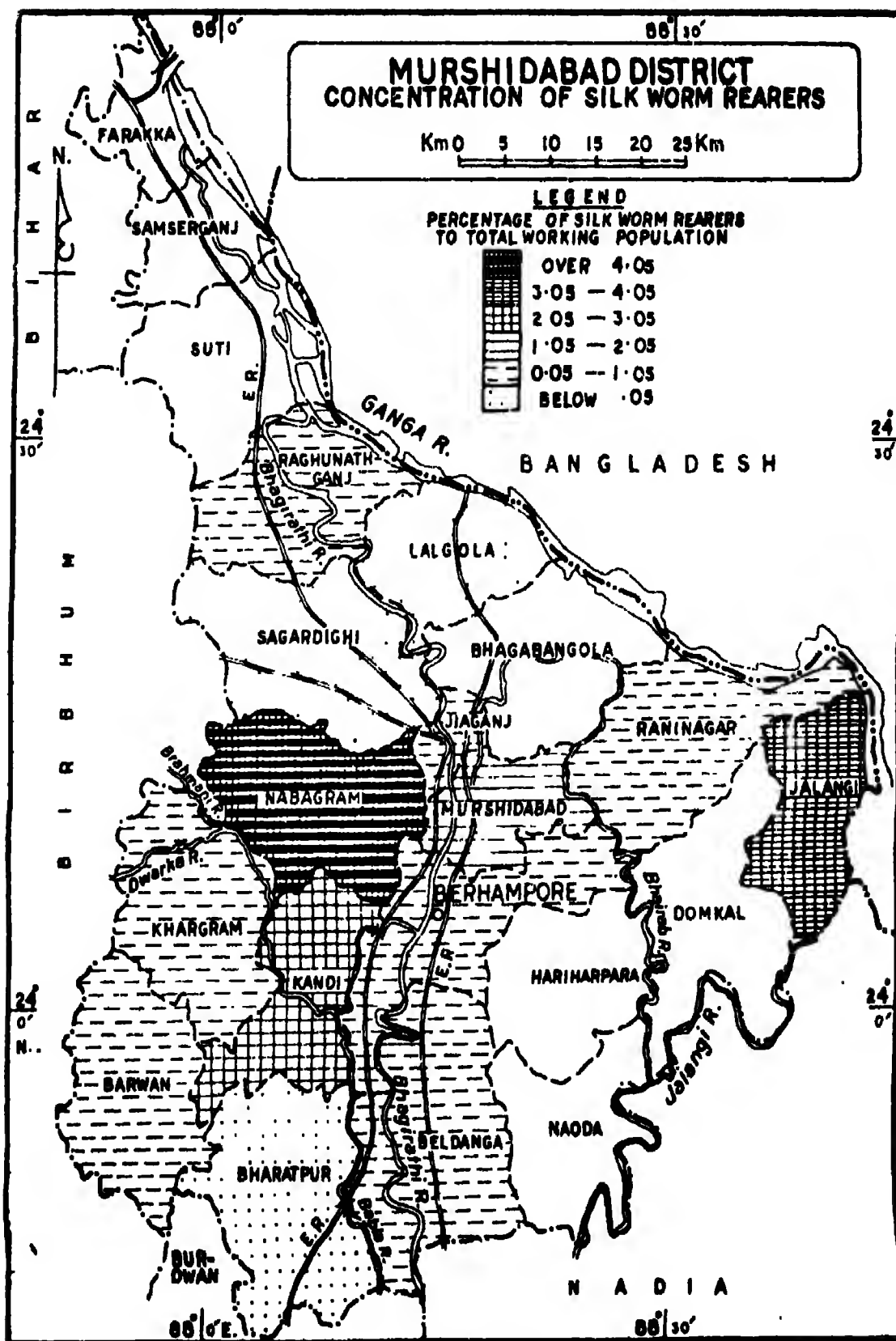


Fig. 15

mulberry, from the case study conducted at 'Balaspur' village in Nabagram P.S., which is noted for cocoon rearing. It has been found that in terms of cash return, mulberry fetches more profit than rice (Vide Table 9.7). If the yarn is produced at home, the profit margin is little less because of additional labour and fuel charges for reeling operations, similarly if the cocoons are preserved and sold the profit margin is somewhat higher than yarn production. It has therefore become apparent that under normal conditions sericulture is more profitable than the cultivation of any other field crops of this district.

Table 9.7

Economics of production of rice and mulberry at Balaspur village,
Nabagram P.S. 1980

	Rice	Mulberry culture
Area under cultivation (hectare)	0.81	0.27
Production (Kg.)	2,239.20	9,330.00
Cost of Production (Rs)	562.50	1,120.00
Sale price (Rs)	2,700.00	7,500.00
Net profit	2,137.50	6,380.00

Silkworm Rearing

The rearing of cocoons depends on both physical and social attributes. The physical attributes are the supply of good quality mulberry leaves, supply of disease-free layings, application of pesticides for eradication of fly pest etc. and the social attributes include the rearing skill of the cultivators, and over and above the age old occupational tradition of the rearing families which help the farmers to continue with the practice of rearing even in the midst of adverse circumstances. There are about 7,725 rearers in the district who are scattered in about 266 villages. The rearing activities are conducted throughout the year.

Concentration of Rearers : An attempt has been made to analyse the degree of concentration of silk-worm rearers in the district and a hierarchy has been determined in terms of spatial units (Vide Table 9.8 Fig. 15).

Table 9.8

Hierarchical distribution of silkworm rearers in Murshidabad District, 1980

Name of P. S.	Total rural workers	Workers as percentage of District total	Total rearers	Rearers as percentage to total rearers of the district	Ratio between the percentages of total rearers and total rural workers
1	2	3	4	5	6
Nabagram	28,541	6.31	2,707	36.52	5.59
Khargram	35,547	7.86	1,910	24.92	3.17
Burwan	35,024	7.75	80	1.04	0.13
Kandi	26,813	5.93	65	0.84	0.14
Bharatpur	46,425	10.27	34	0.44	0.04
Beldanga	62,805	13.90	1,105	14.41	1.03
Jiaganj	5,332	1.18	75	0.97	0.82
Raghunathpur	45,756	10.12	40	0.52	0.05
Lalgola	26,147	5.78	8	0.10	0.01
Sagar-dighi	34,063	7.54	12	0.15	0.01
Berampore	40,652	8.99	49	0.63	0.07
Jalangi	23,049	5.10	1,419	18.51	3.62
Raninagar	41,570	9.20	159	2.07	0.22
Murshidabad	18,067	—	—	—	—

(Source : Computed from the records of Directorate of Sericulture and Silk-Weaving, Berhampore).

It is evident that Nabagram ranks first in terms of concentration of silkworm rearers, being followed by Jalangi, Khargram and Beldanga P.S.

Depending on the rural conditions prevalent in Bengal villages, an

attempt has been made to quantify the factors of production of cocoons with that of sericulture. Taking the census data of 1976-77, a correlation co-efficient (Vide Fig. 13, Table 9.9) has been calculated between the two variables, i.e., total number of sericulturists and total production of cocoons in this district. The value of 'r' reveals a significant and positive relation which substantiates the fact that production is dependent on the increasing number of skilled labourers/rearers.

Table 9.9

Efficiency rate of cocoon rearers in Murshidabad District, 1980

Name of Block	X Number of sericulturists	Y Production of cocoon (Kg.)
Nabagram	1,930	274,779
Jalangi	1,356	45,526
Raghunathganj	4	457
-do- II	44	6,192
Raninagar II	260	2,842
Sagardighi	11	2,340
Bharatpur	30	2,242
Beldanga I & II	1,263	81,502
Kandi	35	2,456
Burwan	60	9,982
Jiaganj	37	8,010
Khargram	1,774	301,500
Berhampore	68	4,873

(Source : Computed from the records available at Directorate of Sericulture and Silk-Weaving, Berhampore).

Case Study of Balaspore - A Commercial Rearing Village

An intensive field study was conducted at Balsapur village during 1980. There are about 100 rearers of cocoon and 60 reelers engaged in silk-yarn production in this village. Reeling operations are not very important here. Mulberry covers approximately 640 ha. of land in the 'Balaspur Circle' comprising of 64 adjoining villages. The production of cocoon in this region suffered a serious set-back during the floods that damaged wide-spread mulberry leaves and silkworm eggs during 1978. During that year production of cocoon was only 2,500,000 Kg. Mostly nistari variety of cocoons are reared here, except in the November-December harvest, when bivoline

cocoon is reared. The rearers face the problem of irrigation, the only source being the river which dries up during summer months. The leaf yield is, therefore, dependent on availability of water. The egg supply comes from the government grainage. The maximum production per season is 18/20 Kg. and there are about 5 commercial seasons for rearing, i.e., a) February-March, b) April-May, c) July-August, d) September-October, and e) November-December.

Nature of Holding : Most of the rearers possess their own mulberry land and the entire leaf production is utilised for rearing. If at any season there is excess production, the leaves are sold at the rate of Rs.100 to Rs.150 per quintal. The cocoons are either sold to the reelers within the village or to the traders who have inter-regional transaction of cocoons.

Marketing of Cocoons : The normal rate of cocoons (Multi-voltine) varies from Rs.16.00 to Rs.18.00 per Kg. This again fluctuates from season to season depending on the yarn market. This phenomenon is quite significant, because cocoon price is usually determined by yarn price and this again is dependent on the existing demand of woven fabrics, which is subjected to a wider consumer market. This vertical linkage in price structure is made further complicated by the monopoly trade system in cocoon and silk yarn, which is a common practice here as in other parts of India, resulting to a sense of insecurity in the primary producers of the isolated villages.

In the face of such multiple constraints it is surprising to note that sericulture in Murshidabad District is recording slow but steady progress (Vide Table 9.10).

Table 9.10

Progress of sericulture in Murshidabad District, 1970-80

	1970-71	1979-80
Area under mulberry (ha.)	537.51	1,230
Number of persons engaged in rearing	1,400	32,000
Production of cocoon in Kg.	385.3	974
a) Number of Charkha basins	500	794
b) Number of filature basins	Nil	1 filature with 50 basins is under construction

(Source : Directorate of Sericulture and Silk-Weaving, Berhampore).

Weaving

This region as has been mentioned earlier is very famous for weaving. The industry at present is concentrated at several places of the district. But there are four important centres of concentration, viz.,

- i) Mirzapur-Gankar (Raghunathgunj P.S.)
- ii) Islampur-Chak (Raninagar P.S.)
- iii) Panchthupi (Burwan P. S.)
- iv) Salar-Teya (Bharatpur P.S.)
- v) Jiaganj (Jiaganj P.S.).

Types of Weaving : In this region, two types of silk weaving are in vogue, namely weaving of 'Kora than' and weaving of 'Garod'.

i) The weavers of 'Kora thans' use unbleached and untwisted re-reeled silk yarn both for warp and weft. In some cases, warps are doubled or tripled according to the denier of raw silk while in other cases single warp is woven with doubled or tripled weft. These 'Kora thans' are generally used for printing sarees, dress materials, scarves, stoles etc. Nagar and Chak Islampur are famous for weaving of 'Kora thans'.

ii) In case of Garod thans, generally twisted and bleached silk yarns are used. Twisting is done either before or after bleaching. The usual fabrics manufactured in this process are shirting, suiting, bordered sarees - both plain and jacquard and dhuties. This kind of weaving with bleached yarn - both twisted and untwisted, has become the speciality of Jiaganj and Mirzapur.

Nature of Weaving : The nature of weaving in this region is entirely handloom oriented and about 60% of the weavers of the district have been brought under the Khadi Commission. The rest 40% operate privately.

There are around 10,000 weavers in the district. Of this, the maximum concentration occurs at Lalbagh sub-division, where there are about 4,000 weavers.

Table 9.11

Distribution of looms in co-operative sectors in Murshidabad District,
1980

Name of the Block	Number of Looms
Hariharpara	25
Raghunathganj I-II	25
Raninagar	460
Bharatpur II	172
Kandi	100
Khargram	581
District Total	1,363

(Source : Directorate of Handlooms and Textiles, Berhampore).

Case Study of Chak-Islampur - A Typical Weaving Village

A survey was conducted at Chak-Islampur village in Raninagar P.S. in 1980, where certain characteristics of weaving have been identified. This is a traditional weaving village, where the weaving of 'Matka' and 'Kora than' are important. Most of the weavers of this village have been brought under Khadi Samity. The private weavers buy yarns from the Khadi Samity. The monthly production of 'Kora' silk is around 55m. and that of 'Matka' silk 22m. per weaver. This, however, depends on the quality of the yarn and demand. The weavers occasionally suffer from scarcity of raw materials. Sometimes the weavers have to buy yarns directly from the reelers or from the small producers. They also purchase from the malajans/traders at times, depending on existing demand.

The standard price for double thread locally known as (Dui-tari) is Rs.190-200 and for single thread (Ek-tari) is around Rs.150-160 per 11m. of fabric. But this price level is subject to fluctuations. As a result sometimes the weavers have to suffer from heavy loss. The normal profit margin for 11m. of finished fabrics is around Rs.35 to Rs.40.

Functions of the Khadi Samity

The Khadi Commission procures the cocoon through the 'Collective Cocoon Purchase Committee' whose Head Office is located at Malda. The price is fixed according to a system known as 'Kakme', in which the output of yarn from the dry cocoon is taken into consideration. The cocoons are reeled by the employees of the Khadi Samity and their wages are fixed according to the wage chart fixed by the Khadi Board from time to time. The estimated cost of production of 1 Kg. of yarn from the bi-voltine cocoons comes to Rs.355/- and in case of yarn from 'nistari' cocoon it is somewhat less, viz., Rs.250/- for the same amount.

This yarn is then given to the employee weavers of the Khadi Samity and their wages are also fixed. In this way an integration has been achieved between the reelers and the weavers and there is no question of raw-material scarcity or problems in marketing. The entire operation is conducted by the Khadi Board and there is no scope for private monopoly. In the following table an attempt has been made to break up the ultimate cost of the finished fabric and at the same time a cost-benefit analysis has been worked out.

Table 9.12

Cost structure and consumers' prices of silk products in West Bengal in
Khadi Sector, 1980

Items of expenditure	per 11 m. fabrics (Value in Rs.)	
	Single thread	Double thread
Cost of yarn	170.00	220.00
Weaving wage	50.00	60.00
Dyeing & printing	50.00	50.00
Margin	67.00	82.50
Cost price	270.00	330.00
Sale value	337.00	412.50
Net profit	67.00	82.50

(Source : (Private Communication) Chandrakanta Lalit Mohan,
Resham Khadi Samity, Berhampore).

This profit, however, is shared by 3/4 heads, and consequently there is little scope for individual profit. The Khadi Samity gives facilities like ex-gratia relief and contributes to the welfare fund for the artisans.

The price structure in the private sector has also been studied both for double thread and single thread 'Kora than'.

Table 9.13

Price structure for the finished products (in Private Sector) in
Murshidabad District, 1980

Double Thread		Single Thread	
Kora than (11 m.)	200.00	Kora than (11 m.)	160.00
Yarn	160.00	Yarn	130.00
Weaving wage	40.00	Weaving wage	30.00
	200.00		160.00
Printing & dyeing	60.00	Printing & dyeing	50.00
Cost price	260.00	Cost price	210.00
5 1/2 m.	130.00	5 1/2 m.	105.00
Margin = 25%		Margin not fixed	
Sale price	325.00	Sale price	300.00*
		Cost price	210.00

Table 9.13 (Contd.)

Double Thread		Single Thread	
Cost price	260.00		
Net profit	Rs. 65.00		Rs. 90.00
1 Saree ..	Rs. 32.50	1 Saree ..	Rs. 45.00
			*Arbitrary. The real profit is difficult to assess accurately.

(Source : Directorate of Handloom and Textiles, Chandrakanta Lalit Mohan, Resham Khadi Samity, Berhampore).

The profit earned by the private sector, however, is largely diverted to the Mahajan or middlemen as commission. The weaver's share on profit is nominal. It may, however, be mentioned in this connection that the exact profit in the private sector cannot be accurately calculated. Moreover, the profit margin is highly fluctuating. Over and above the primary producers are greatly exploited in this sector.

Therefore the solution lies in bringing all the weavers under the Khadi or other co-operative societies.

Table 9.14

Wage chart of the employees under the Khadi Board, in Murshidabad District, 1980

Categories of fabrics	Size Demer	Total Reed	Total wages (in Rs. per Piece)
1	2	3	4
Silk kora than (11 m.)	$\frac{11 \times 115}{2350}$	1800 S.T.	46.05
Silk kora than (11 m.)	$\frac{11 \times 115}{2350}$	1800 D.T	52.81
Silk kora than (11 m.)	$\frac{11 \times 115}{2350}$	1800 T.T	64.51
Silk kora than	11 × 126	1800 S.T	64.37
Silk kora than	11 × 126	1800 D.T	73.41

Table 9.14 (Contd.)

	2	3	4
Silk kora than	11 × 126	1800 T.T	85.57
Silk kora than	11 × 91	1800 S.T	35.60
Silk kora than	11 × 91	1800 D.T	42.53
Silk kora than	11 × 91	1800 T.T	53.81
Silk kora than	11 × 81	1800 S.T	32.18
Silk kora than	11 × 81	1800 D.T	37.31
Silk kora dhuti	5.03 × 114	1800 S.T	22.87
Silk kora dhuti	5.03 × 114	With boder D.T	27.15
Silk kora dhuti	5.03 × 114	Without boder D.T	25.94
Silk chaddar	2.74 × 137	1800 D.T	18.90

(Source :Chandrakanta Lalit Mohan, Resham Khadi Samity, Berhampore).

The wage rate of the weavers varies with the size of reed and the quality of the thread.

Weaving Efficiency

In order to understand the production efficiency of the weavers, a quantitative analysis is made between the number of looms and production of fabrics (Vide Table 9.15). The correlation co-efficient value 'r' gives a very high value of +0.99 which substantiates the fact that the weavers of Murshidabad District are highly efficient in the technique of weaving. In spite of multiple constraints in the field of production, i.e., inadequate supply of yarn, lack of finance etc. the production efficiency is fairly high.

It is interesting to note that employment figure per loom now stands at 2.5 persons. The preparatory process before weaving requires the services of more than one skilled weaver, and usually women and sometimes children of the weaver's family participate in the preparation of fabrics prior to actual weaving.

Table 9.15

Weaving efficiency of the artisans in Murshidabad District, 1980

Name of BL	X Number of looms	Y Production of fabrics (in metres)
Nabagram	17	8,500
Khargram	2,516	1,258,000
Burwan	267	1,285,000

Table 9.15 (Contd.)

Name of BL	X Number of looms	Y Production of fabrics (in met- res)
Kandi	67	29,500
Bharatpur	168	81,500
Raghunathganj I	289	139,500
-do- II	268	129,000
Raninagar I	1,019	50,500
Berhampore	89	44,500
Jiaganj	249	122,000
Hariharpara	138	66,500

(Source : Directorate of Sericulture and Silk-Weaving).

Sericulture of Murshidabad and Malda : A Comparative Study

Malda is basically a commercial rearing region, where mulberry cultivation is the basic occupation of the sericulturists. The cocoons are produced here for commercial purpose and sold to the reelers. The region has become famous in reeling. The yarn production, however, lies both in the hands of private reelers as well as with some registered societies, like Khadi institutions and government filature. The raw material for cocoons, i.e., seed cocoons are usually brought from Murshidabad. As Malda has not specialised in weaving, bulk of raw silk produced here is diverted to Murshidabad and other places of West Bengal. Malda has a monopoly market for the transaction of silk yarn.

In contrast, Murshidabad is noted for seed producing, where sericulture is a subsidiary occupation of the people. Mulberry, therefore, has to face a stiff competition from other field crops like rice or jute. So mulberry cultivation becomes the secondary occupation of the farmers. On the other hand, this region has excelled in silk-weaving and is the principal producer of all kinds of woven fabrics in West Bengal. Here again, the woven fabrics are sent to Serampore for printing and dyeing. This operation cannot be economically conducted at Murshidabad. The mills are, therefore, located near the market centre, and the finished products are produced there. This kind of disintegration at each sector of the industry often creates complications. It is now time to consider whether all sectors should be integrated at one place or whether it should be left as it is. There have been several attempts on the part of the State Government through various co-operative societies to arrive at an integrated operation, but there are certain economic as well as socio-cultural constraints which stand in the

MULBERRY AREAS & PRODUCTION OF COCOON

BIRBHUM

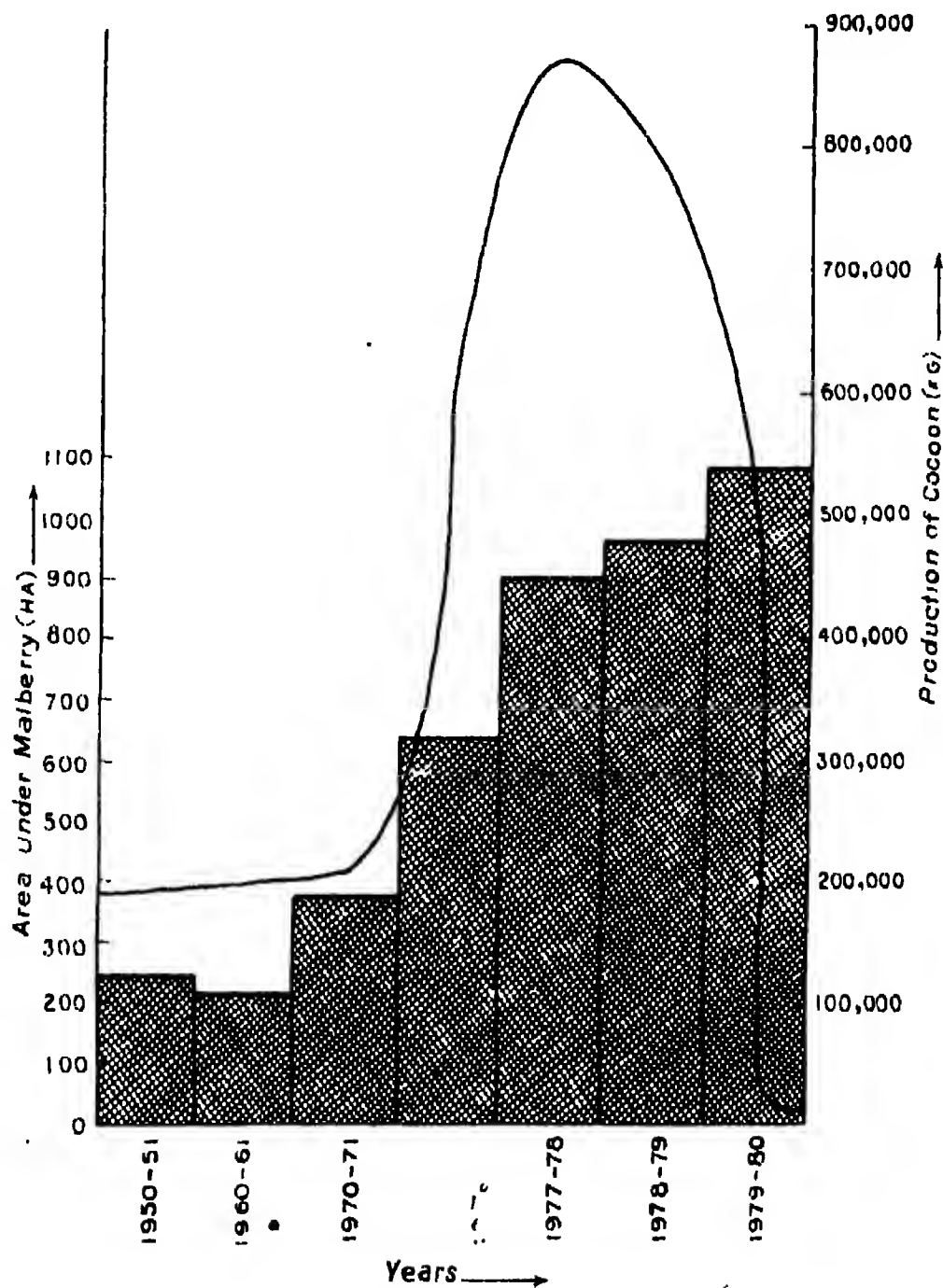


Fig. 16

way of sectoral as well as spatial integration.

Problems

Sericultural operations in Murshidabad District are presently faced with certain problems. These are summarised as :-

- i) non-availability of mulberry cuttings, disease-free eggs, fertilisers etc.,
- ii) inadequate supply of irrigation water,
- iii) competition from other crops,
- iv) unscientific method of rearing,
- v) uncertainty regarding the cocoon market,
- vi) lack of proper reeling facilities,
- vii) inadequate supply of silk-yarn resulting in a raw-material scarcity among the weavers,
- viii) poor return from the commodity produced because of price fluctuations, and
- ix) lack of organised marketing facilities thereby allowing the exploitation of middlemen.

The solution to all these problems lie in bringing the rearers, reelers and weavers in a common fold by demolishing the institutional barriers and by improving their economic condition through subsidies, grants etc. and at the same time by protecting the sericulturists from the competition from other crops. If these become a reality, sericulture in the district can hope for a bright future.

iii) Birbhum - A Non-Traditional Area of Integrated Sericulture

Introduction

Birbhum ranks third amongst the sericulture centres of West Bengal, covering all the components of culture, viz., raising of mulberry, rearing of cocoon, reeling and weaving. This district has the distinction of harbouring both the mulberry as well as non-mulberry sectors of sericulture.

The region is traditionally famous for producing woven fabrics of mulberry and tasar worms. However, cultivation and rearing of silkworms are also important here. In recent years the State Government has paid emphasis on extension of mulberry culture in the hitherto non-traditional tracts like southern part of Birbhum district comprising of Bolpur, Illambazar, Nanaor, Dubrajpur and Labhpur P.S. The objective is to raise the standard of living of poor and marginal farmers by providing them with secondary source of income.

Table 9.16

Area under mulberry and production of cocoons in Birbhum District,
1950-1980

Year	Production of mulberry (ha.)	Production of cocoons (Kg.)	Number of Reapers	Production of silk yarn (Kg.)	Number of Reeling units
1950-51	243.13	194,442	1,282	—	159
1960-61	215.25	201,549	1,350	—	159
1970-71	376.38	203,618	1,649	—	172
1976-77	639.57	622,422	3,420	23,529	257
1977-78	905.66	873,413	3,490	—	257
1978-79	960.09	801,086	3,498	—	280
1979-80	1,074.58	32,288	3,970	—	282

(Source : Directorate of Sericulture and Silk-Weaving, Birbhum District, Suri)

Of late, sericulture has become a developing enterprise in Birbhum district (Vide Table 9.16, Fig. 16). Since 1950 mulberry cultivation has recorded an increase of over 340% and cocoon production by over 310%. In 1979-80, there was a sharp decrease in the production of cocoon, but there was no decrease in mulberry area. This is due to climatic hazards. The unprecedented rain of 1979-80 resulted in a sharp decline of cocoon production in the area. The number of reeling units have also increased from 1950 to 1980.

Ecological Conditions

Birbhum district shows ecological diversities being reflected in the variations of her terrain, climate, soils and other natural elements. The region, on an average, receives an annual rainfall of 1250 mm., of which about 60% takes place during the months of July to September. The temperature ranges between 12° to 33°C (Vide Fig. 2). Humidity is moderate excepting during summer when it comes to 45%. The climate of the district is ideal for mulberry culture and silkworm rearing during August-March. During the early stages of rearing (1st & 2nd) the room temperature requires to be preferably more along with humidity. During the later stages of the life cycle of the silk worms both room temperature and humidity should be brought down. In the following table, the optimum temperature and humidity are noted which need to be maintained in the rearing chamber at different stages of worm's life cycle.

Table 9.17

Optimum climatic components for silk worm rearing at Birbhum District

Life cycle	Temp. (°C)	Relative Humidity (in p.c.)	Life Cycle
1st stage	26-27	85-90	20-25 days 21 days for
2nd stage	26-27	85-90	multi-voltine and 25 days
3rd stage	25	80-85	for bi-voltine
4th stage	24	75-80	
5th stage	23	70-75	

(Source : Central Sericulture Research Station, Berhampore).

It may be noted that the rearers do not have any sophisticated instruments within the rearing chamber to control the temperature and humidity. In most cases, crude methods like cross ventilation through windows, use of wet papers for increasing humidity etc. are practised. Therefore, rearing largely depends on absolute climatic condition of the region. Under the circumstances, it has been found that the period of November-March is ideally suited for bi-voltine cocoon rearing.

During other periods multi-voltine or nistari/F₁ varieties of silkworms are reared. Scarcity of water may be considered as a major ecological constraint, restricting mulberry cultivation in the district. The region occasionally suffers from drought. Soil is generally friable and lateritic thereby requiring more water. The soil has low-moisture retention capacity. As such cultivation of mulberry is carried on the embankments of the Brahmani, Dwarka, Ajoy and Kopai rivers. The embankments or the lands adjoining them are composed of sandy or sandy-clayey loam. There is also the facility of river lift irrigation as practised in Nalhati P.S. In Bolpur police station pump sets are used for irrigation purposes. River embankments are, therefore, considered as the best ecological unit for mulberry cultivation. In most of the mulberry growing areas of Bolpur. Nanoor, Labhpur, or Ilambazar Police Stations well irrigation from tube or dug wells are practised. But sometimes, construction of a well is costly. The government loan and subsidy is not enough for the purpose. Hence the poor and marginal farmers face difficulty to tackle the problem of water supply in their lands. The soils are usually friable, loose and mixed with kankar containing ferruginous concretions, as at Khoskadambapur village in Bolpur Police Station. Therefore, the regions lying at a distance from the river valley are not favourable sites for mulberry cultivation. Incidentally,

it may be mentioned that technological and institutional inputs can overcome the ecological hazards to some extent. If dry farming techniques together with inter-culture of vegetables and mulberry are adopted along with extended tube well irrigation facilities, more areas can be meaningfully brought under mulberry cultivation. As it stands today, the uncultivable fallow lands of Islampur, Srichandapur and Khoskadambapur villages in Bolpur Police Station have been already brought under mulberry cultivation. Attempts are also being made to extend its cultivation in Nanoor and Illambazar Police Stations as well.

Characteristics of Sericulture in Traditional and Non-Traditional Areas

Mulberry cultivation and silkworm rearing in Birbhum district are carried at i) the traditional areas of Nalhati-Rampurhat, and ii) the non-traditional areas of Bolpur Police Station. The two areas show diversities in the technique of mulberry cultivation and rearing of commercial cocoons.

Traditional Area of Production

The northern region is noted for its high productivity of mulberry leaves (about 28,000/ha.). Mulberry is planted in a trench system and mainly high bush varieties of *Morus indica* and *M. mandalaya* are cultivated. The mulberry fields are located on the embankments of rivers and also on the denuded slopes of high lands. About 70% of mulberry farms of Nalhati, Muraroi, Mayureshwar and Rampurhat Police Stations receive the facilities of irrigation. Irrigation water is collected either from the rivers by pump sets or through shallow tube-wells.

Mallarpur and Rampurhat region is ideally suited for silkworm seed preservation because of its dry climate. North of Rampurhat commercial rearing is more common. Important centres of traditional mulberry culture of this region include Nalhati and Muraroi. A case study was conducted in Raipur village of Nalhati Police Station.

Case Study at Raipur Village

The crops are harvested 5-6 times during autumn, spring and summer (two/three crops).

The silk-worms are of nistari F₁ (hybrid variety) and bi-voltine varieties. The production of cocoon is about 160 Kg. per rearer in a season. Supply of disease-free layings for commercial rearing, comes from the government nurseries at Debra, Ranaghat and Bishnupur. The rearers have to pay Rs.10/- to buy 100 d.f.l. from these nurseries. It is needless to say that supply is short of the demand.

The price of the cocoons varies between Rs.20/- for F₁ and RS.30/- for

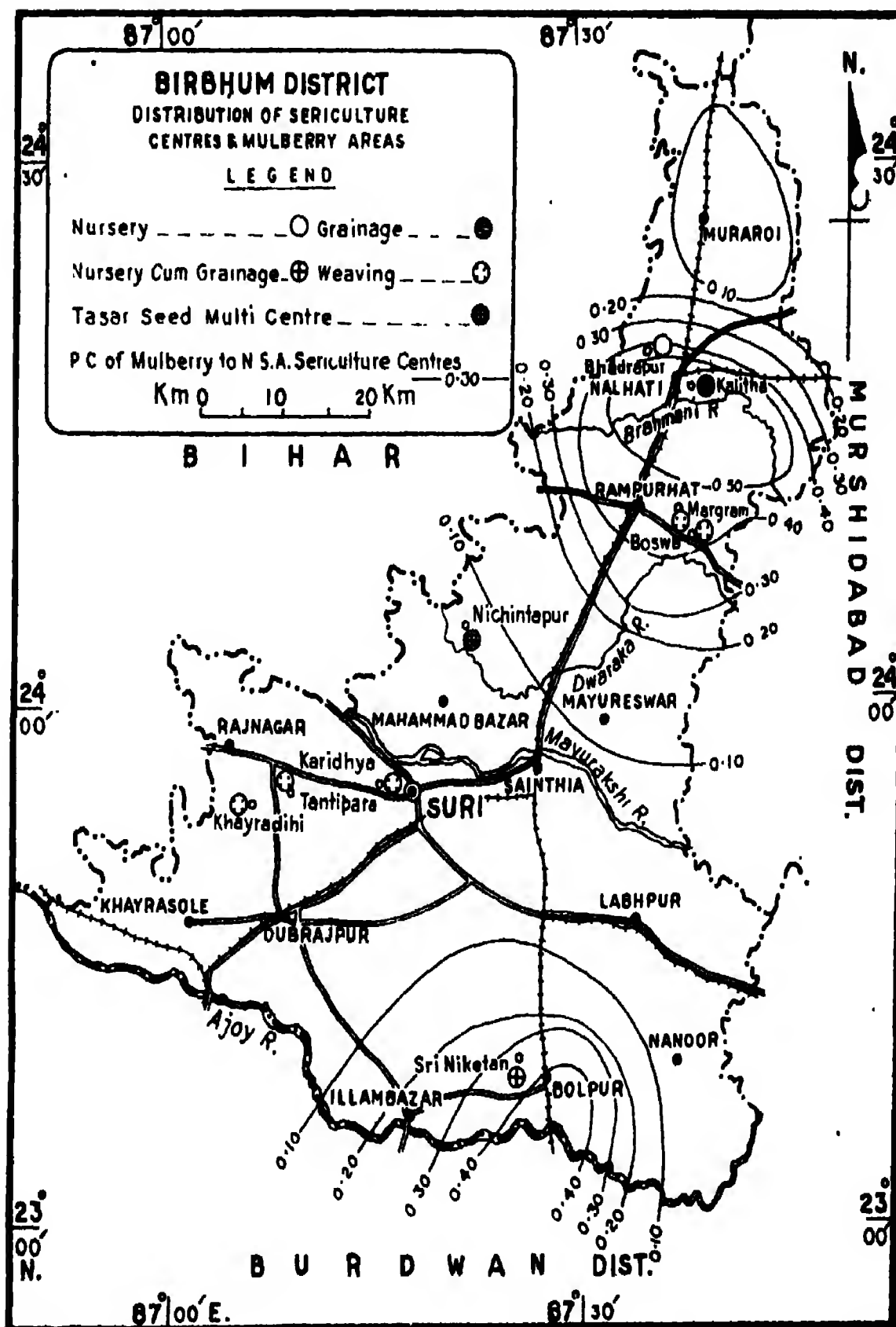
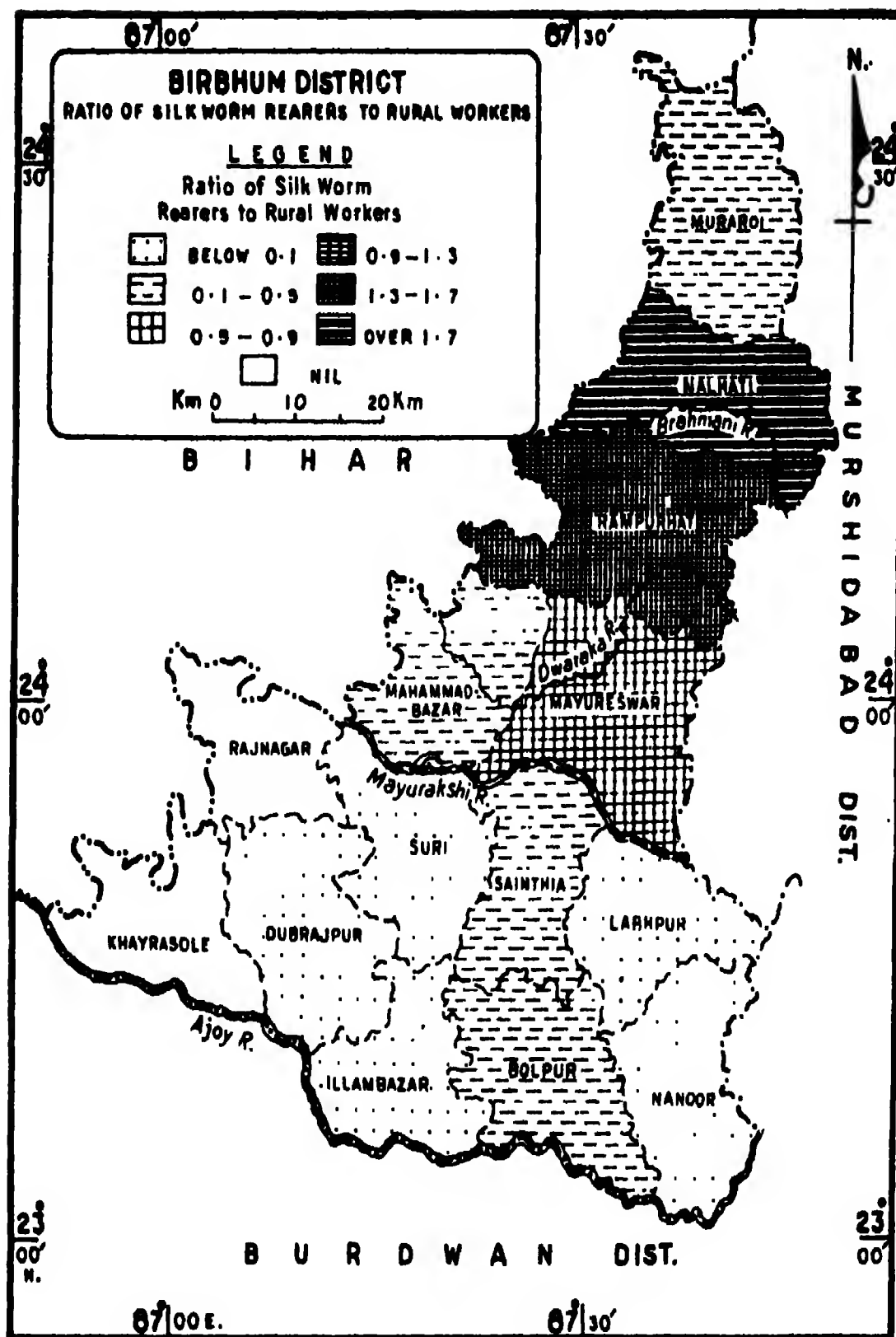


Fig. 17



bi-voltine varieties. However, the marketing is done in bulk and the entire harvest is sold to the cocoon merchants. The price is highly fluctuating depending on the amount of harvest subjected to existing agro-climatic conditions in a particular season. Therefore, in most cases, the rearers are deprived of their fair share. Sometimes the cocoon dealers advance cash even before the actual harvest, which is fixed invariably below the market price. Thus the exploitation becomes total.

Reeling is occasionally done depending on the cocoon stock and the price. If the cocoon price becomes too low the yarn is reeled. Production of warp thread is 1 Kg. and that of weft thread is 600 gm. per basin per day. Warping is not done here because of the inferior quality of thread, wherein uniform reeling is not feasible. Monthly production of reeled yarn is about 30 Kg. but during the monsoon season because of high humidity the production decreases.

The reeled yarn is again sold to the dealers in Malda, the average price being Rs. 220/- kg. or even more.

In this village there are 75 households of rearers, of which 15 are reelers. These reelers are mostly wage earners. Sometimes the reelers come from the adjoining areas of Jangipur in Murshidabad. About 40 country basins operate engaging 80 persons in this occupation.

In this village the mulberry cultivation and silk-worm rearing are taken up as a subsidiary occupation to agriculture. All the rearers are cultivators having both mulberry lands as well as agricultural lands used for the cultivation of rice, wheat, pulses, mustard and vegetables. However income from 0.14 ha. of mulberry lands has been calculated as Rs. 1,000/- per annum (inclusive of all costs) while income from the same amount of land under rice has been estimated as Rs. 400/-. It is further studied that cost of mulberry land is somewhat higher than that of rice. This village enjoys a better economy, as most of the villagers are engaged primarily in agriculture and secondarily in sericulture.

Several economic factors contribute to the higher cost in mulberry cultivation. For example, most of the cultivators have to hire pump sets, operated by hired labourers, incurring an expenditure of Rs. 20/- to Rs. 30/- on an average per hour of pumping operation. Irrigation is provided usually once in a fortnight.

Loopholes in Technological Inputs : Diesel supply is erratic. The supply of chemical fertiliser is inadequate and costly. The recommended dose is 400-600 kg. per hectare. As the average market price of the fertilizer is Rs. 7.50 per kg. (NPK), it is well beyond the means of the cultivators. The

supply of disease-free-lyings is not regular. These handicaps naturally result in poor productivity, and high cost of production. In the absence of a secured market, the cultivators occasionally have to face additional risks. Despite such constraints, the traditional areas of the district continue to produce cocoon throughout the year because of historico-geographical inertia.

Case Study of Islampur village (Bolpur P. S.) : Non-Traditional Area of Production

In this village sericulture has been introduced two years back with government assistance. Several hectares of fallow lands have been reclaimed on the bank of the Kopai river where mulberry cultivation has become feasible with the help of canal irrigation from the river. However, the land is liable to floods and during the unprecedented flood of 1978, mulberry crop was damaged.

Mulberry is usually cultivated in small plots, with individual plots ranging between 0.13 to 0.27 ha. of area. The leaf yield is approximately 3,360 Kg. per annum while the production of multi-voltine cocoons is 90 Kg. per year. Rearing is carried in the farm households with a view to minimising cost. Rearing of silkworm was initiated here with 12 to 14 persons, but because of inadequate bank loan further extension of mulberry cultivation or cocoon rearing has not made much progress. The rearers of this region also face the problem of marketing due to the presence of monopoly business operated by a group of people. The mahajans or merchants operate collectively resisting further extension. In the non-traditional regions market resistance is least.

It is, therefore, clear that despite ecological congeniality, development of sericulture lags behind in this area, due to complicated market network in a free-enterprising system.

Concentration of mulberry cultivation and rearing of cocoons are maximum in and around Nalhati region (Vide Fig. 17 & 18). Besides the traditional.

Table 9. 18

Distribution of mulberry areas in Birbhum District, 1981

Name of P. S.	Percentage of Mulberry to N. S. A.
Muraroi	0.10
Nalhati	2.29
Rampurhat	0.41
Mayureshwar	0.17
Mahammad Bazar	0.04
Sainthia	0.004

Table 9.18 (Contd.)

Name of P. S.	Percentage of Mulberry to N. S. A.
Labhpur	0.03
Suri	0.003
Illambazar	0.11
Bolpur	0.33
Khayrasole	—
Nanoor	0.03
Dubrajpur	0.02
Rajnagar	—

(Source : Directorate of Sericulture and Silk-Weaving, Birbhum District, Suri).

Table 9.19

Concentration of rearers in different P. S. of Birbhum District, 1981

Name of P. S.	No. of rural workers	Percentage of rural workers to Dist. total	No. of rearers	Percentage of rearers to total rearers in the Dist.	Ratio between the percentage of rearers and rural workers
Muraroi	46,710	10.59	108	2.71	0.25
Nalhati	41,207	9.34	2756	69.19	7.40
Rampurhat	51,284	11.63	643	16.14	1.38
Mayureshwar	41,998	9.52	336	8.43	0.88
Mahammad Bazar	23,286	5.28	29	0.72	0.13
Sainthia	30,203	6.85	3	0.08	0.14
Labhpur	28,658	6.50	39	0.97	0.003
Suri	26,777	6.07	1	0.02	0.01
Illambazar	23,436	5.31	12	0.30	0.05
Bolpur	30,372	6.89	40	1.00	0.14
Khayrasole	24,218	5.49	x	x	x

Table 9.19 (Contd.)

Name of P. S.	No. of rural workers	Percentage of rural workers to Dist. total	No. of rearers	Percentage of rearers to total rearers in the Dist.	Ratio between the percentage of rearers and rural workers
Nanoor	30,760	6.97	6	0.15	0.02
Dubrajpur	27,837	6.31	10	0.25	0.03
Rajnagar	13,998	3.17	x	x	x

(Source : Directorate of Sericulture and Silk-Weaving, Birbhum District, Suri).

silk produced from mulberry, Birbhum has also specialised in the production of non-mulberry silk fabrics. Of this category, the common variety produced is tasar.

Characteristics of Tasar Culture

Tasar cocoons are not locally cultured in Birbhum District, though the host plants for tasar are grown here in abundance. Tasar seed cocoons are brought from Bihar, Orissa and Madhya Pradesh and are locally nurtured. The price of tasar cocoons ranges between Rs. 75/- to Rs. 160 per Kg. depending on the quality. In this region, tasar weaving is concentrated at Tantipara village in Rajnagar P. S. The weaving sector faces shortage of raw-material which is a handicap for the growth of tasar industry in the region.

Large scale scientific reeling is not prevalent and consequently the yarn supply falls short of the demand. Annual requirement of cocoons is 1,100 Kg. for reeling purposes. However, due to government initiative several hectares of forest lands have been surveyed and tasar host plants have been identified in small blocks. Besides, a tasar culture centre has been started at Patel Nagar with the help of Central Tasar Research Station and improved techniques of reeling are being adopted.

Table 9.20

Concentration of forest areas in different Police Stations of Birbhum District, 1981

Name of P. S.	Total area (ha.)	Total Forest area (ha.)	Percentage of Forest area to total area
Muraroi	32,668.39	66.01	0.20
Nalhati	36,208.33	182.86	0.50
Rampurhat	47,867.09	835.35	1.74
Mayureshwar	92,874.00	x	x
Mahammad Bazar	31,718.01	2,904.03	9.15
Rajnagar	23,593.86	2,527.65	10.71
Khayrasole	27,720.10	1,075.84	3.88
Dubrajpur	36,395.29	3,264.83	8.97
Suri	35,451.47	1,071.33	3.02
Illambazar	26,466.73	1,355.87	5.18
Sainthia	31,520.80	227.55	0.72
Bolpur	33,786.46	420.66	1.24
Labhpur	27,454.01	x	x
Nanoor	23,421.66	x	x

(Source : Compiled from the Records of Divisional Forest Office, Suri).

The maximum concentration of forest is found at Rajnagar P. S. being followed by Mahammad Bazar, Dubrajpur and Illambazar. The previous records reveal that this district was noted for tasar culture about 15 to 20 years back. But non-availability of tasar host plants and proper seed and lack of marketing organisations have diverted the rearers gradually to other occupations.

Table 9.21

Distribution of tasar host plants in Birbhum District, 1980

Name of the P. S.	Name of the Forest	Forest species and the coverage area (in ha.)
Mohammad Bazar	1. Baidanathpur (mixed forest)	Mainly sal plants 15% asan in patches (61.5 ha.)

Table 9.21 (Contd.)

Name of the P. S.	Name of the Forest	Forest species and the coverage area (in ha.)	
	2. Charicha (Raghubarpur)	Sal mixed with Asan and Mohua (389.5 ha.)	
	3. Korla Gopalnagar	5 to 15% tasar food plants (164 ha.)	mainly arjun plantation mixed with Eucalyptus, Sonajhari etc.
	4. Rashpur	(152.11 ha.)	
	5. Nijuri	(165.64 ha.)	
	6. Tangsuli	(127.92 ha.)	
	7. Nimdaspur	(113.57 ha.)	
	8. Birpur	(164 ha.)	
	9. Chackmukunda	(14.35 ha.)	
	10. Nischintapur Kenpahari	(168.51 ha.)	Very thick arjun plantation
	11. Dencangang	(42.23 ha.)	
	12. Chandpur	(138.99 ha.)	
	13. Harinsingha	(28.29 ha.)	
	14. Kalipahar		
	15. Chackraypur	Area not estimated.	
	16. Ganpur		
	17. Ghagha	5% to 15% Asan rest sal (not estimated)	
Rajnagar	1. Chandrapur	Very scanty	
	2. Lockpur	Asan flora	
Khairasole	1. Khayrasole	Mainly sal (Area not estimated).	
Suri	1. Kachnjur	8.2 (ha.) Arjun plantation.	
	2. Polashbari	(Area not estimated).	
	3. Radhamadhabpur	About 10% Arjun and Asan plantation.	

Source Directorate of Sericulture and Silk-Weaving, Birbhum, 1980).

From the above Table it becomes clear that tasar rearing is concentrated in western part of Birbhum comprising the police stations of Mohammad

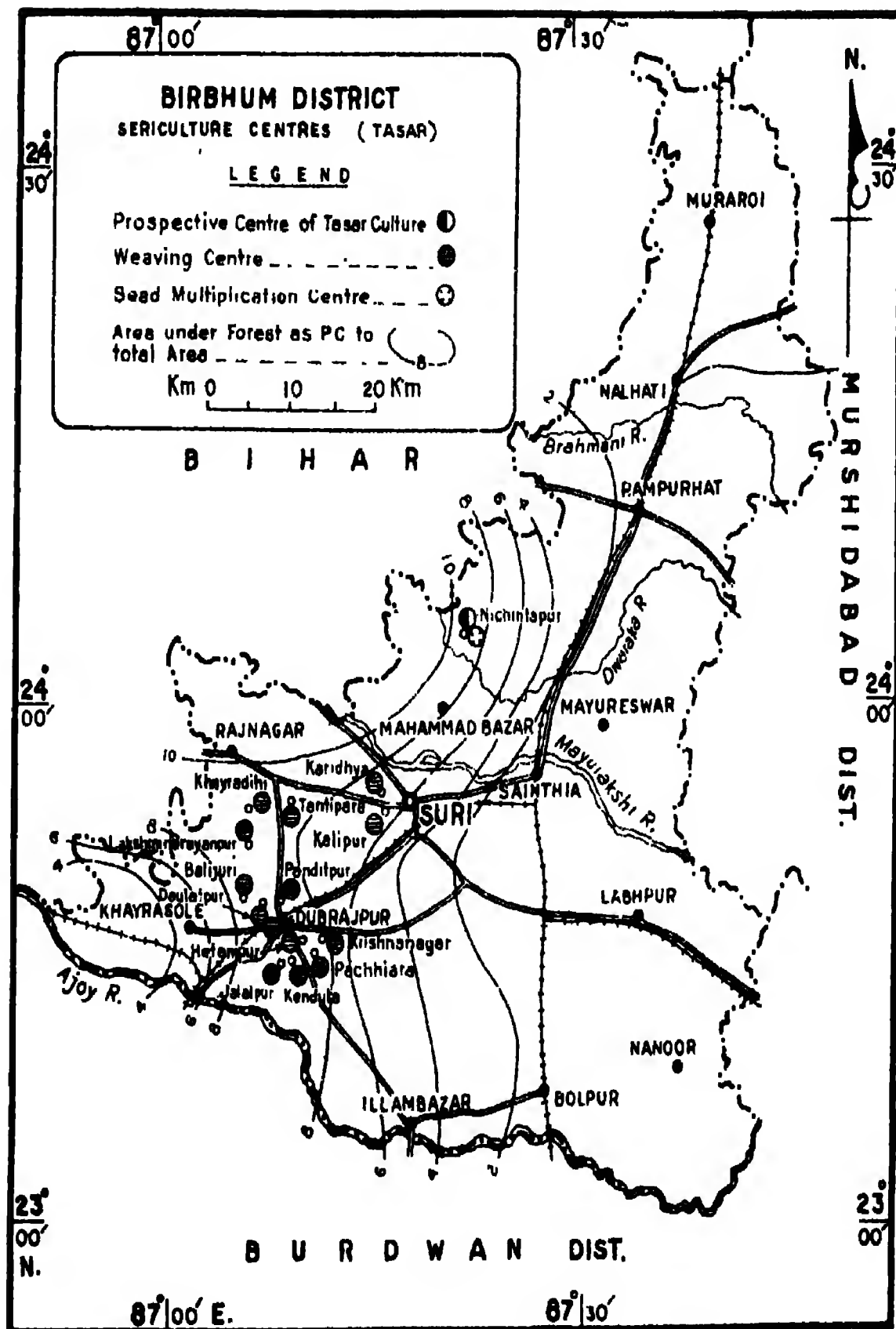


Fig. 19

Bazar, Rajnagar and Khoyrasole. But this sector needs further organisation (Vide Fig. 19).

Case Study Of Tantipara Village : A Weaving Centre of Tasar Fabrics

Weaving of various kinds of tasar fabrics is in practice at Rajnagar, Dubrajpur, Illambazar and Suri Police Stations.

The distribution pattern of weavers/artisans in these regions is indicated in Table 9.22.

Table 9.22

Tasar weaving in Birbhum District, 1980				
Name of P. S.	Name of village	No. of Spinners	No. of weavers	No. of looms
Rajnagar	Tantipara	900	600	300
	Khairadihi	30	20	10
Dubrajpur	Dubrajpur	15	10	5
	Panditpur	45	30	15
	Panchira	—	—	—
	Kendula	90	60	30
	Hetampur	—	—	—
	Balijuri	9	6	3
	Laxminarayanpur	—	—	—
	Daulatpur	9	6	3
	Jalalpur	6	4	2
	Krishnanagar	6	4	2
Illam Bazar	Sukhbazar	30	20	10
Suri	Kariddha	120	80	40
	Kalipur	120	80	40

(Source : Directorate of Sericulture and Silk-Weaving, Birbhum 1980)

In case of tasar weaving the preparatory stages of processing like spinning etc. are done at the weaver's cottage and in all the cases the entire family labour is involved. The ratio has been taken as 4 : 5 per household.

The weavers of Tantipara village suffer from inadequate supply of cocoons from local sources, which are usually brought from Bihar and Orissa. The system of operation is based on **Dadan** in which mahajans usually give the cocoons to the individual weavers by weight and the fabrics woven are taken by the farmer. The individual weavers having no contact with the market, are unable to obtain sufficient cash return. The product of the labour for weaving fabric is appropriated by the mahajans. The waste

products in reeling and weaving are also taken by them without any payment made to them.

Labour Input

Some of the weavers have their own looms. Average production of these looms is 3 metres of woven fabric per loom, which if sold fetches approximately Rs. 50/-. The individual loom-owners may get bank loan upto the maximum of Rs. 5,000/- per annum. But procurement of yarn and consequent marketing of fabrics are done by the same group of mahajans without establishing any contact with the consumer's market. The usual calculation of production of a specific length of fabric from cocoon stage may be calculated on the basis of production of 13 m. of fabrics from 700 gms. of yarn, which again is produced from 1.65 Kg. of cocoon.

From cocoon the spinning of yarn takes about 15 days of the family labour on a ratio of 4.5 persons. Preparatory stages of weaving takes 2 days and the final weaving requires 8 days. Therefore, the total time requirement comes to 25 man-days of 4.5 persons on an average. This is a very rough calculation of labour involvement because the entire family is often engaged in spinning and weaving activities throughout the day and part of the night.

Therefore, a wide gap exists in terms of economic benefit between the quantum of labour input and the market price of a particular fabric.

Put Out System

Another system of operation is in vogue on a small scale in which the Khadi Commission and other co-operative and registered societies place order in bulk to the individual weavers. These organisations have their own production units, from which yarn is supplied to the weavers. Weavers get wages from the respective institutions which is fixed on piece-rate basis. Some of these weavers have their own looms and some work on common looms owned by the organisation being put out to them. Thus under this system of production the rate of exploitation is minimised. But the number of such weavers form only 20 to 30% of the total weavers of the village.

Because of these problems, the traditional weavers of Tantipara village are now switching over to weaving of cotton fabrics.

Case Study of Boswa Village in Rampurhat Police Station — A Weaving Centre of Mulberry Silk

In contrast to tasar weaving mulberry weaving is much more developed in Birbhum District. In this sector, a study has been carried at Boswa village which is a traditional silk weaving centre. Most of the weavers have their own looms, usually more than two looms. Some of them are engaged as daily-wage weavers. The average production per loom is 11 m. per month which is dependent on market demand. Most of the weavers cater to export orders. The source of yarn supply is through Mahajans/Co-operative

societies. The current price of the yarn is Rs. 350/- for warp and Rs. 225/- for weft per Kg. The requirement per annum is 36 Kg. of yarn and the supply of yarn is ensured throughout the year. Usually two persons work on a single loom but this has a detrimental effect on the production efficiency because it is indeed difficult for two persons to work with efficiency in one loom.

The system of operation is identical to that of Tantipara, involving three types – 1) **Dadan system**, 2) **finance and order system** (individual operation), and 3) **Put out system** (collective operation through registered bodies).

There are about 1,500 looms in this village, of which 300, i.e., about one-fifth of the looms are under the management of registered bodies.

The same group of master weavers and traders operate in every village bringing in the total number upto 5. The marketing system is somewhat similar to that of a triangle, at the apex of which is the master weaver or traders and at the base are the 'paikars' or middlemen who get commission by procuring orders for the individual weavers.

No bleaching and dyeing is done here. All the woven fabrics are sent to Serampore for dyeing, printing and finishing. The skill for dyeing and printing is not developed here.

Around Boswa, there are several other weaving villages, the important ones being Bishnupur, Morgram, Tentulia, Natungram, Sahapur and Dunigram - all in Rampurhat Police Station.

The villages are mostly comprised of weavers whose sole occupation is weaving. Besides the weaving caste, other people have also become interested in weaving. Bank loan is usually given to the private weavers.

Conclusion

As regards to Birbhum, the development strategy should be two-fold, the one covering the mulberry sector and the other relating to non-mulberry sector.

A comparative study of both sectors reveals that mulberry culture and subsequently mulberry silk-weaving are more profitable than other occupations. The viability of tasar culture and subsequently tasar silk weaving are by no means less significant. The region is gradually specialising in tasar weaving and tasar fabrics are in demand for export market. In tasar sector, the constraints are inadequate supply of quality cocoons and yarn. But ecological and economic conditions are congenial for both the sectors. If tasar host plants can be propagated in greater number and scientific reeling can be introduced through government efforts, the region has the viability of becoming an important centre of tasar fabrics. Emphasis should, therefore, be put to integrate the disaggregated mulberry sector and remove

the production constraints of non-mulberry sector to achieve the benefits of both.

iv) Bankura - A Non-Traditional Area of Integrated Sericulture :

Introduction

Sericulture in Bankura is of special significance because of its double potentiality in mulberry and non-mulberry sectors. The district is a traditional centre of silk weaving. Bishnupur and Sonamukhi police stations have great excellence in the art of weaving silk sarees and various kinds of dress materials. However, the region is not particularly important for mulberry production and silkworm rearing because of scarcity of water. Although the laterite belt of the west and alluvium belt of the eastern part of the district have good potentialities in the rearing of silkworms because of dry climate, mulberry farming so far remains poor because of scarcity of water. This in turn restricts the practice of rearing. Therefore, if irrigation water can be provided to the mulberry farms of Bishnupur sub-division and if at the same time the technique of dry farming is popularised to the cultivators, the yield of mulberry is likely to increase in future. New areas can also be brought under cultivation in the eastern region.

Ecological Conditions

The climate of Bankura is dry, the annual rainfall being 1300 mm. About three-fourths of this rainfall are concentrated in monsoon months of June to September (Vide Fig. 2).

Humidity is high in the months of July to September but it is low in other months. There is a seasonal variability of temperature ranging from 20 to 30%. The maximum temperature may be as high as 32°C while the minimum may drop down to 12.5°C.

The optimum temperature and humidity range for the multi-voltine silkworm rearing range between 24°C to 29°C and 60% to 90% respectively. This is true during all stages of the life cycle of silkworms. Climatically the ideal time for silkworm rearing is during the months of August to March. During the winter months (December-January) the bi-voltine varieties of worms can be reared. It has been seen that mulberry can be cultivated on a wide range of soil-type if water can be available to the field. The pH value of soil in Bishnupur sub-division is 6.2 which is found to be congenial for mulberry culture.

Agricultural Base

Before getting into the details of mulberry cultivation and silkworm rearing of the district a short background of her agricultural base may help in identifying the problem. As has been mentioned earlier rainfall is not evenly distributed throughout the year. Substantial portion of the agricultural

base is poor. Very often there is a crop failure, because of drought.

The region is undulating. Large tracts are covered with forests and rocks. But the soil is porous, thus helping rapid drainage and percolation. This particular environment demands irrigational facility. The cultivatable land is also limited, the lower slopes and depressions are fit for cultivation. The district, however, faces the problem of excessive soil erosion which hampers agriculture.

Socio-Economic Constraints

The old land tenure system that was already in vogue before independence has adversely affected the agricultural produce. Because of frequent famine and scarcity, the cultivators are often in debt and this ultimately results in selling of the land. Consequently there are more agricultural labourers in this district than in other districts of West Bengal. The cultivators are generally poor. Under such a system, improvement in the existing agricultural condition is difficult to implement. Although after independence, the old tenure system has largely been changed. The landlord system has been abolished. The landless labourers are taken care of. But this has little influence on the overall agricultural scenario of the district.

Concentration of Sericulture

The eastern part of the district comprising of the police stations of Bishnupur, Sonamukhi, Jaypur, Kotalpur and Patrasayer have mulberry-based sericulture while the western part comprising of the police stations of Saltora, Mejia, Gangajalghati, Chhatna, Indpur, Khatra, Ranibandh, Taldangra, Raipur and Simlapal have tasar-based sericulture.

Mulberry-Based Sericulture

Mulberry area of the district is estimated as 75 ha. almost all of which is concentrated in Bishnupur Police Station. However, in terms of percentage to the net sown area the position of Bishnupur is significant. Mulberry covers only 0.5% of the net sown area. The production of cocoon and silk yarns is showing progressive increase.

Table 9.23

Production of cocoon and silk yarn in Bankura District

Year	Production of cocoon (Kg.)	Production of silk yarn (Kg.)
1975-76	6,126	366
1976-77	7,402	478
1977-78	9,072	582

(Source : Directorate of Sericulture and Silk-Weaving, Bishnupur).

At present there are about 425 rearers scattered in 26 villages of Bishnupur sub-division.

Sericulture at Morar Village in Bishnupur Police Station

This is the most important village of the region where a large number of people are engaged in sericulture. There are about 300 to 350 rearers, most of whom do not have any mulberry land. The cultivation is mainly carried on in lands belonging to the Forest Department.

This village has lateritic soils, being mixed with kankar. The water table is extremely low, being lower than 27 m. Most of the mulberry fields are rainfed. The pH value of the soil varies between 5.9 to 6.2

Methods of Cultivation

It is significant to note that the methods of cultivation vary from region to region depending on the availability of water. Here the mulberry saplings are planted in a pit system, in which water requirement is minimum. The crop is usually of high bush type, attaining to a height of 1.5 m. In this system no pruning is necessary. The leaves are harvested by plucking. The average size holding is very low, being 0.40 ha.

Number of Crops

In this village, about 8-10 crops are harvested in a year. The harvesting is controlled by the quality of leaves and monthly temperature, the latter being important for the health of worms. Of these crops the autumn or the October/November crop is most important because it gives highest yield. Additional labour is required during the plucking season. At this time the labourers are engaged in the field on a daily wage rate of Rs.500/ Rs.1000. Recent increase in mulberry production of this village is the result of Rs. 1000/- government initiative. Rearing is mainly done by womenfolk, the rearers get their egg supply from the Sericulture Nursery of Bishnupur Farm.

Sericulture is combined with agriculture in this village. It is mainly regarded as a subsidiary occupation. Unlike Malda, there are no exclusive sericulturists in the village.

The most important variety of cocoon produced here is nistari. It is heat resistant, multi-voltine, Bengal type of cocoon, ideally suited for the rigorous climate of the region. Repeated attempts of the State Sericulture Department to introduce bi-voltine variety of cocoons during the winter months have not been successful. The local sericulturists are not willing to take up the rearing of this exotic variety. These are the institutional problems prevalent in this village. The bond of tradition is too strong to have enabled the sericulturists to take up a new system of production.

The rearers sell their cocoons to the nursery owned by the State Government. But sometimes private transactions are carried out, between the rearers and reelers within the district and also with the districts of Malda, Murshidabad and Birbhum. The cocoons are sold at the rate of

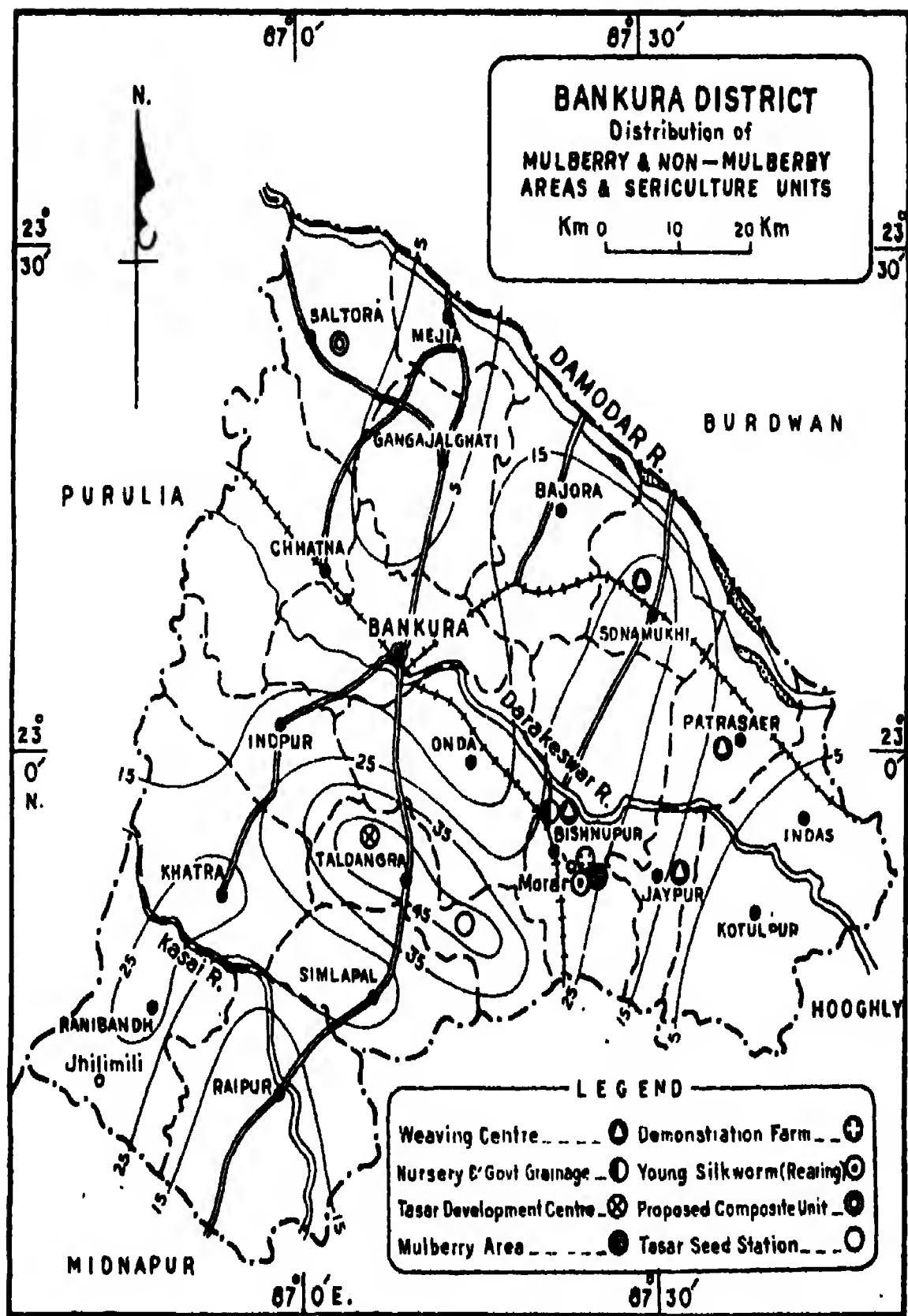


Fig. 20

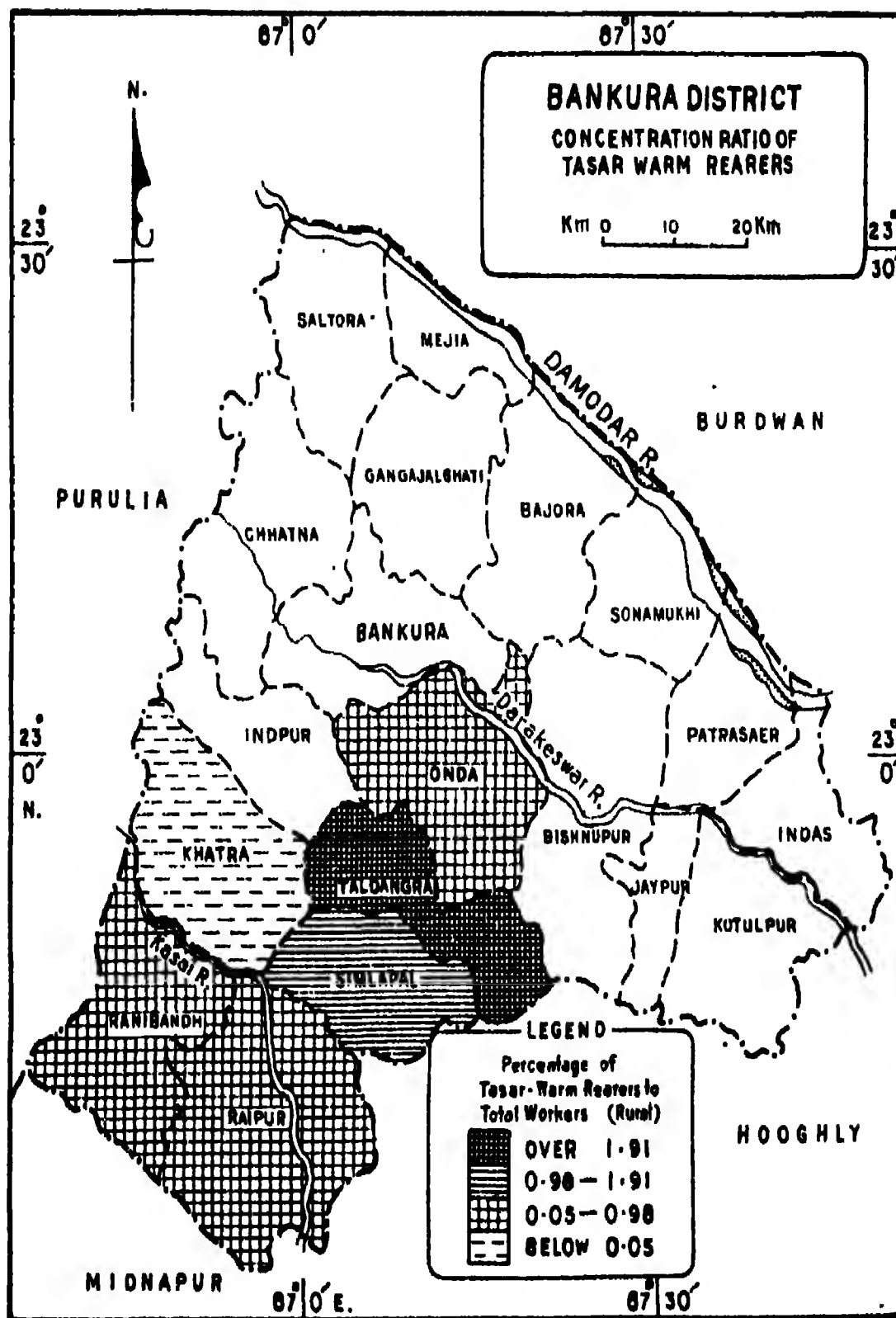


Fig. 21

Rs.20/- per kg. in case of bi-voltine variety and Rs.16/- per kg. in case of nistari or multi-voltine variety.

In this village about 0.13 ha of mulberry land fetches about Rs.500/-, therefore income per hectare may be well over Rs.3,800/- provided regular supply of eggs is ensured.

However, the scarcity of water and lack of fencing facilities occasionally result in crop failure. Moreover, rearing condition is too primitive thereby enhancing the risk of damage to the silk-worms.

Apart from the rearers who have direct dealings with the government, there are a number of private rearers in this village. The exact number of rearers is difficult to assess because no systematic enumeration has been taken. However, according to the State Government, the private rearers produce about on an average 1,500 kg. of cocoons annually.

Extension of Sericulture

Due to the efforts of the Government Sericulture Nursery at Bishnupur, sericulture is gradually becoming popular in this district. This is evident from the recent increase of the number of rearers; the number has increased from 128 in 1975 to more than 300 in 1982.

The reason for such an increase is liberal grants and subsidies provided by the Government and improvement of the transport system.

Mulberry Nursery

The State Sericulture Nursery at Bishnupur, plays a significant role in the development of sericulture in the district. The nursery occupies an area of 6.5 ha. and has its own mulberry plantation in the form of high bush. There are five rearing houses, where bi-voltine cocoons are reared and supplied to the sericulturists. Its average annual production is about 400 quintals of mulberry leaves and 1,500 kg. of cocoons. The main function of this nursery is to supply mulberry cuttings and seed cocoons to the commercial rearers of Bankura and adjoining districts. Assistance is also given to the individual sericulturists in the forms of aid and subsidies through 'Bank Finance Scheme'.

Mulberry in Relation to Other Food and Cash Crops

Usually mulberry lands are not used for other cultivable crops. Therefore, there is no danger of encroachment of mulberry lands on other farm lands. Moreover, it has been proved that mulberry culture is more profitable than either rice or jute. But in view of the dependability of mulberry on irrigation the prospect of its expansion in area seems to be a capital investive proposition.

The present irrigation system is inadequate to serve the purpose. Dug

wells are usually used for irrigation. But dug wells also are dried up in seasons of difficult rainfall. Use of ground-water with deep tube wells may be the answer. It is only with this method, that supply of leaf can be ensured throughout the year, to the rearers. This will improve the quality of leaves as well as of cocoons at the same period.

Tasar based Sericulture

Being situated at the fringe of the Chota Nagpur plateau, the district falls within the main tasar belt of India. The district has an abundant growth of tasar host plants like *Shorea robusta* (sal), *Terminalia arjuna* (Arjun), *Terminalia tomentosa* (Asan) etc. Forests cover about 17.15% of the total area of district in 1971. The average annual production of tasar cocoons is 3,000 kg. in the district, having a face value of Rs.80,000/- only.

At present, the total number of tasar rearers are estimated as 315. The rearers are scattered in these police stations of Taldangra, Simlapal, Khatra, Raipur, Onda and Ranibandh covering 43 villages. Of these areas, the highest concentration of tasar rearers occurs at Taldangra (Police Station) which also has the highest percentage of forest area in the district. A possible relationship with the forest areas to the concentration ratio of tasar rearers in the western part of the district can be established (Vide Fig. 20 & 21).

Table 9.24

Concentration of forests in Bankura District, 1971

Name of Police Stations	Total area (ha.)	Forest area (ha.)	Percentage of forest to total area
Bishnupur	36,892	12,808	34.71
Jaypur	26,567	4,746	17.86
Sonamukhi	38,503	10,077	26.17
Borjora	38,897	9,047	23.25
Gangajalghati	37,594	656	1.74
Saltora	31,878	3,045	9.55
Bankura	41,334	5,432	13.14
Indpur	30,428	5,475	17.99
Taldangra	35,435	16,876	47.62
Simlapal	31,317	8,797	28.09
Raipur	76,418	10,582	13.84
Ranibandh	43,341	13,939	32.16
Khatra	35,443	9,263	26.16
Mejia	16,342	225	1.37
Onda	51,275	5,382	10.49

Table 9.24 (Contd.)

Name of Police Stations	Total area (ha.)	Forest area (ha.)	Percentage of forest to total area
Kotalpur	31,290	152	0.48
Chhatna	45,344	3,175	7.00
Patrasayer	32,521	4,663	14.34
Indas	44,069	—	—
District total	724,897	124,346	17.15

(Source : Census of India -Bankura District Handbook, 1971).

Table 9.25

Spatial distribution of tasar rearers in Bankura District, 1980

Name of Police Stations	Number of rural workers	Rural workers as P.C. to Total workers	Total No. of tasar rearers	Tasra rearers as P.C.to total rearers	Ratio between the percentage of tasar rearers and that of total rural workers
Talda-ngra	22,634	11.68	142	45.07	3.85
Simla-pal	21,691	11.19	54	17.14	1.53
Khatra	34,780	17.95	4	1.26	0.07
Raipur	52,527	27.11	49	15.55	0.57
Onda	36,319	18.74	44	13.96	0.74
Ranib-andh	25,773	13.30	22	6.98	0.52

(Source : Compiled from the Records of the Directorate of Sericulture and Silk-weaving, Bishnupur).

It is evident that concentration of tasar rearers has a positive relation with the distribution of forest areas in the district and accordingly the concentration ratio is either high or low depending on the growth of specified forest species namely asan or arjun. However it will not be out of place to mention that the concentration of tasar rearers also depend on factors other than availability of tasar host plants like, rearing skill and availability of

disease-free layings, etc.

Favourable Environment of Tasar Cocoons

Tasar worms, being indifferent feeder, can also flourish on other trees like *Lagerstroemia parviflora* (Sidha). In this region tasar worms prefer the Sidha tree for the completion of their life-cycle. This particular species possesses the property of rapid growth. The tree does not die even under severe pruning or plucking of the leaves, and therefore are useful for tasar cultivation. But the tasar worms produce better cocoons when cultured on asan or arjun trees along with sal. The yield rate is usually low if the tasar worms are fed by the leaves of Sidha trees. The species of tasar worm are locally known as 'Rohini', 'Tira' and 'Mugia', all belonging to *Antheraea mylitta* group.

In Bankura district, particularly towards the western part geographical environment is ideal for tasar culture and hence there is a predominance of tasar over mulberry silk culture. However, there exists scope for further improvement.

Tasar Rearing at Fakirdanga (Onda P.S.) and Sukhanibas (Taldangra P.S.) Villages :

At Fakirdanga, the host plants of tasar occupy an area of about 60 hectares. The forests have a predominance of 'sal' and 'sidha' trees.

Three commercial crops are mainly harvested here. These are : a) July-August, b) September-October, and c) December-January. During August-September, a seed crop is usually harvested.

The tasar cocoons are sold to the local reelers and are also sent to the adjoining areas of Bihar namely at Chakulia, Chaibasa. The transactions are generally done through middlemen. Sometimes these are sold directly to the Khadi Commission.

Problems and Prospects

Recently there is a gradual denudation of tasar plants because of their replacement with Eucalyptus and Akashmoni trees in the district. This policy of the Forest Department to increase the area of eucalyptus and akasmani is adversely affecting the tasar rearers. Procurement of disease free eggs has also become a problem. In addition, due to the operation of middlemen, marketing of the reeled products and woven fabrics are affected. All these have resulted in the dwindling of this industry in recent years.

Despite various administrative and entrepreneurial drawbacks, tasar culture in West Bengal has managed to survive mainly because of the economic advantages of tasar culture. Some of these advantages are noted below :-

a) Cultivation of tasar host plants is cheaper than that of mulberry cultivation. The trees grow naturally in the forests and therefore the

maintenance cost is negligible.

b) The rearing process of tasar silk-worm is simple as the insects feed on the trees. Although in recent years, the experiments have shown that alternation of both indoor rearing during the early stages of the worms and their subsequent transfer to the host plants in the forests, give better yield. In the tasar culture there is no need for any elaborate construction of rearing rooms. The labour input for rearing is also much less as cocoons are thrived naturally on the trees. In short, the entire rearing process can be operated at a lower cost, and at the same time the tasar fabrics command a good market both at home and abroad.

Taking into account the various aspects of tasar culture and its existing potentialities for future expansion, the State Government has set up a Demonstration Farm and an Extension Centre at Taldangra. These centres supply seed cocoons and help in expansion of tasar culture in the State. Under the extension programme, a government farm near Bankura has been selected, where 'arjun' trees have been planted on an area of about a hectare in size. The trees are planted in pit system with 1 x 1 m. of spacing. The total land area under this farm is about 5.6 ha. It is proposed that, if arjun trees are planted alternately with mulberry, the production cost will be less and the yield will be higher. A new composite unit is being constructed at Saltora which will provide storage facilities for disease free eggs and supply seeds to the commercial rearers.

Reeling and Weaving in Bankura (Mulberry Sector)

One of the vital sectors of sericulture is silk reeling. From the study it becomes evident that reeling is not much developed in Bankura district. In the villages, 'country basins' (Katghai) are mostly used for reeling purpose. Under this system, the yarn produced is of inferior quality and percentage of silk-waste is high. Approximately 500 gm. yarn can be reeled per basin per day. At Morar village there are only 5 reeling units for the production of yarns.

Role of Khadi Institutions

At Bishnupur, 'Silk Khadi Seba Mondal' has achieved integration in sectoral production. This organisation has its own reeling and weaving units. The cocoon supply usually comes from the Government Nurseries. The reeling operation is mechanised. Therefore, the yarn is of superior quality. This unit has a very organised weaving section where weaving is done in jacquard looms. The high priced and highly sophisticated Baluchari sarces are produced at Bishnupur and are directly marketed in Calcutta.

Under the Khadi sector there are about 80 handlooms at Bishnupur, 60 handlooms at Sonamukhi and 15 handlooms at Changdoba, bringing

about 155 looms under the organised sector. There are about 280 looms in the private sector scattered in the police stations of Bishnupur, Sonamukhi, Patrasayar and Jaypur. There were over 1,300 weavers in the district in 1981.

Types of Fabrics

Several types of fabrics are woven here. These are white shirting, check and stripped shirting, and various other types of shirting, handkerchief, silk-dhupchaya, coloured silk coating, silk matka shirting, jhute scarf, jhute lungi, chadar, matka etc. These woven fabrics are the speciality of Sonamukhi and Birsingha P.S. of Bankura.

Bishnupur and Changdoba police stations, on the other hand, have specialised in the weaving of silk sarrees and kora thans (bleached cloth). Some of the special types are 'Baluchari sarree', 'Korial with jari', silk matka, crepe, 'Valkal than', heavy brocade dress material, matka dhuti, matka ketia than, tasar valkal twisted than, tasar valkal coating etc.

Apart from these the kora thans are also woven in Birsingha thana.

Outlook

A comparison of sericulture of this district with Malda reveals some interesting pictures. In Malda the main emphasis is on rearing and reeling, but in Bankura it is on weaving. The rearing environment of Bankura is less congenial than Malda and reeling system is also not adequate. The weavers have to get their supply mostly from private sources. The private traders are more interested in profit maximisation and consequently the supply of yarn is related to the market condition of a particular season. This affects the mind set-up of the artisans, because they are not sufficiently rich to buy yarn at an inflated price. Although the certified institutions under Khadi and Village Industries Commission are engaged in reeling operation and providing the required yarn, yet the supply falls short of the demand. Hence there is a need for integration of the various sectors of production of sericulture in this district.

It can be further mentioned that the emphasis of development and expansion should be more on the tasar sector. The various production constraints like proper maintenance of host plants, non-availability of disease-free eggs etc. in tasar culture should be removed and at the same time marketing facilities at all stages of production should be improved to get the maximum benefit from the system.

Darjeeling - A Potential Area of New Experiments in Mulberry Culture and Silkworm Rearing :

Introduction

The hills of Darjeeling District has been particularly selected during the 5th Plan period (1974-79) for the development of sericulture because

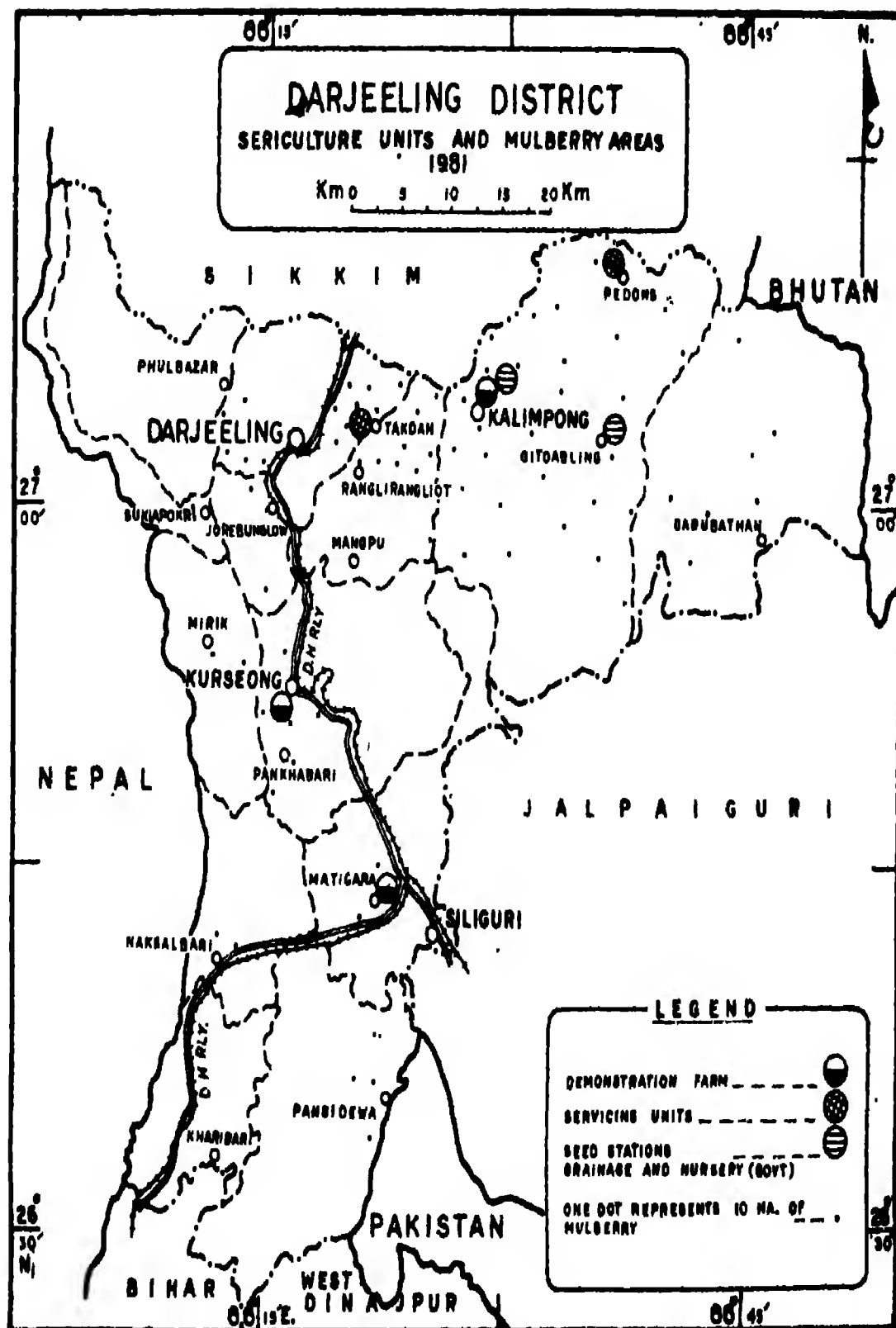


Fig. 22

of her favourable environment. The main objective is to propagate high yielding strains of mulberry, hybridisation of silk-worm races between the indigenous and exotic varieties, preservation of silk-worm seeds for distribution in other centres. As a part of the programme, several nurseries and grainage stores have been established at Kalimpong and Kurseong Police Stations.

In West Bengal, the traditional area for sericulture and silk weaving is the Ganga Plain, where the environment is congenial to multi-voltine heat resistant **Bombay craesi** variety of silk-worm. This particular variety yields comparatively low quantity of silk of inferior quality. West Bengal, therefore, perpetually faces the problem of shortage of quality cocoons. To overcome this handicap, sericulture programmes of this district are being introduced as the environment is congenial.

Ecological Conditions for the Culture of Bi-Voltine Silkworms :

The temperate climate, gentle hill slopes and well drained soils of the hill are ideal for mulberry cultivation and bi-voltine silk-worm rearing. In Darjeeling, sericulture is particularly developed at Kalimpong sub-division. The region records a mean annual temperature of 18°C, annual rainfall of about 2,250 mm. and an average humidity of 80%. This is the ideal habitat for the growth and propagation of mulberry leaves on the one hand, and rearing of bi-voltine superior varieties of silk-worms on the other. The soils are identified as sandy clay loam with an average pH value ranging between 5.7 and 6.2.

Economic Factors

The cost of mulberry cultivation is higher in the Himalayan region because of hill slopes and rough terrain. In the hill slopes terracing is essential. Moreover, the transportation charges for supply of mulberry cuttings, fertilisers etc. are much higher. These factors are detrimental to the commercial expansion of sericulture in this hilly region.

Segregation of Sectoral Activity

Darjeeling is not a traditional area for the propagation of mulberry or sericulture. But sericulture has been introduced here through government subsidies and finance from other institutions. As such only cultivation and rearing activities are presently carried here. The reeling and weaving sectors are yet to be developed. Lack of skilled labour or artisans may be a contributing factor for the poor development of reeling and weaving. The region, therefore, persists as a raw-material base, supplying bi-voltine cocoons to the silk reeling and weaving centres of the State.

Spatial Distribution of Mulberry

In these areas mulberry cultivation is carried at an altitude of 900 m. to 1,650 m. under dry farming conditions (Vide Fig. 22). A minimum of 2 or 3 years are required to have the full harvest of leaves.

Table 9.26

Mulberry areas and production of cocoons at Kalimpong Hills, 1981

Name of P.S./BL	Name of the villages	Number of Sericulturists	Area Under mulberry cultivation (ha.)	Production of cocoons (Kg.)	Value in (Rs.)
Kalimpong	Nimbong	1	0.41	—	
	Nobong	3	0.62	—	
	Singjee	1	0.20	—	
	Samalbong	4	0.82	—	
	Echa	8	1.64		
	Choto Bhalukthop	8	2.17	20	624.34
	Bara Bhalukthop	48	13.94	188	8,203.56
	Tashiding	15	3.08	15	524.23
	Kalimpong	2	0.41	—	
	Kalimpong II				
	Sakiyong	2	0.41	—	
	Upper Sakiyong	5	0.82	6	
	Lower Sakiyong	1	0.20	—	
	Tandrabong	5	1.64	40	
	Kashyong	10	2.76	6	
	Pedong	1	0.20	—	
	Paigong	1	0.20	—	
	Gitdabling	3	0.62	—	
	Gitbeong	4	0.82	—	
	Paygong	2	0.41		
	Sangsay	16	5.13	38	2,006.27

Table 9.26 (Contd.)

Name of P.S./BL	Name of the villages	Number of Sericulturists	Area Under mulberry cultivation (ha.)	Production of cocoons (Kg.)	Value in (Rs.)
Pulbazar Bijanbari	Chebu	1	0.20	—	—
	Nore Busty	1	0.20	—	—
	Nore	19	3.90	—	—
	Naya Busty	3	0.62	—	—
	Samtalay	1	0.20	—	—
	Kizam	1	0.20	—	—
	Relling	35	8.01	66	2,929.70
	Samalbong	2	0.51	—	—

(Source : Directorate of Sericulture and Silk-weaving, Government of West Bengal).

Methods of Cultivation : In Kalimpong hills, all the three types of mulberry, viz., tree, high bush and low bush types are in cultivation. The tree varieties are mostly 'Kosen' which is noted for higher yield of leaves. The yield from both the indigenous low bush and exotic high bush varieties vary between 10,000 to 13,000 Kg. per hectare in full productive plantations. At the government nurseries at Kalimpong and Kurseong, various experiments are carried out with different systems of plantations with different varieties of mulberry strains.

Rearing Season : The rearing of silk-worms usually coincides with the propagation of mulberry, as the silk-worms need to be fed with fresh leaves throughout their life cycle. There are five harvests in a year. These are :-

1. April — May
2. June — July
3. September — October
4. October — November
5. March — April

During the first three harvests seed cocoons are raised, while during the latter two, commercial cocoons are reared.

The bi-voltine silk-worms usually have two life cycles. During the larval stage they prefer 26°C to 27°C of temperature and 85% to 90% of relative humidity. During the spinning stage, the ideal temperature is said to be between 18°C to 21°C and relative humidity as 75%.

Rearing Cocoons : The methods of rearing are the same as in other parts of West Bengal. The eggs are kept on the bamboo trays, mulberry leaves being spread on it. The rearing of cocoons in the villages was initially started at Kalimpong and Bijanbari (near Darjeeling). The cocoons obtained from private sources are estimated about 1,200 Kg. per annum. Of these, only 60 to 70% are available as seeds. There are about 142 sericulturists in the district. They do not possess any organised mulberry plantation. In the vicinity of Kalimpong town, mulberry is grown, wherein silk worms are also reared. Besides technical guidance, the rearers do not get any financial aid or other incentive for improvement in cocoon production. There is, however, a provision for 50% bank loan and 25% government subsidy. Most of the rearing operations are carried in a makeshift arrangement in the dwelling houses of the cultivators having no arrangement of the control of temperature and humidity. In some cases the rearers do not have adequate number of rearing appliances. This condition needs improvement.

A number of experiments have been conducted at the government nurseries of Kalimpong and Kurseong during various seasons of the year with a view to analysing the results of rearing on yield. The outturn per 100 layings reared is given below :-

Table 9.27

The results of rearing experiments conducted at the research stations of Darjeeling district

Year	(in 000 Kg.) Production of cocoons at the experimental farms in Darjeeling district		
	Kalimpong P ₁	Kalimpong P ₂	Kurseong
1970-71	127.76	136.57	62.45
1971-72	111.79	137.90	46.54
1972-73	104.64	171.75	131.87
1973-74	103.34	155.84	96.96

(Source : Directorate of Sericulture and Silk-weaving, Kalimpong, 1978).

The outturn of good cocoons at government nurseries at Kalimpong is maximum during September and October (267,895 Kg.). The outturn is minimum in the months of April-May. The former season, therefore, is more suitable for rearing.

The rearing results of P₁ cocoons at Kurseong nursery do not indicate much fluctuation in the outturn. The maximum outturn was recorded in

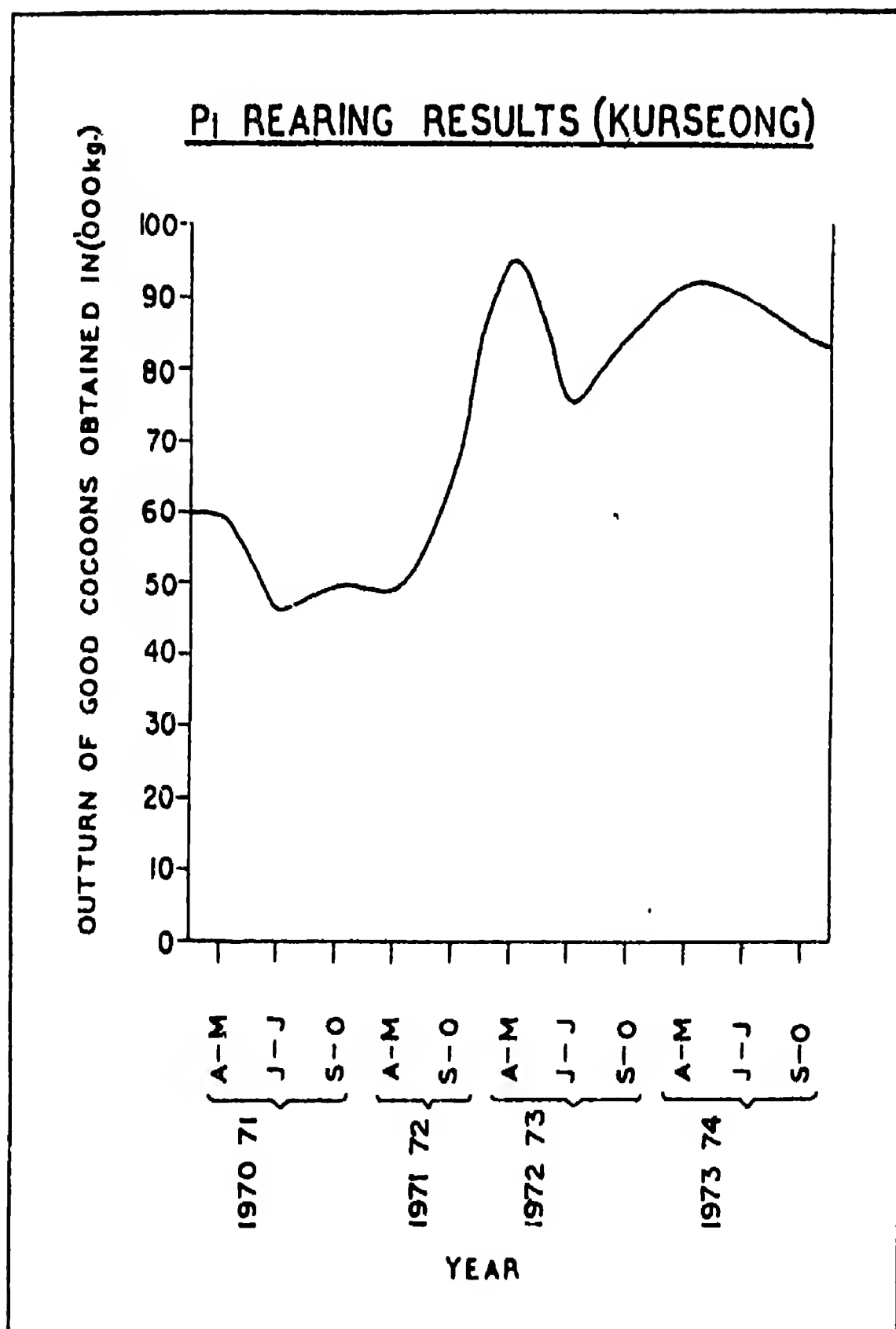


Fig. 23

P₁ REARING RESULTS (KALIMPONG)

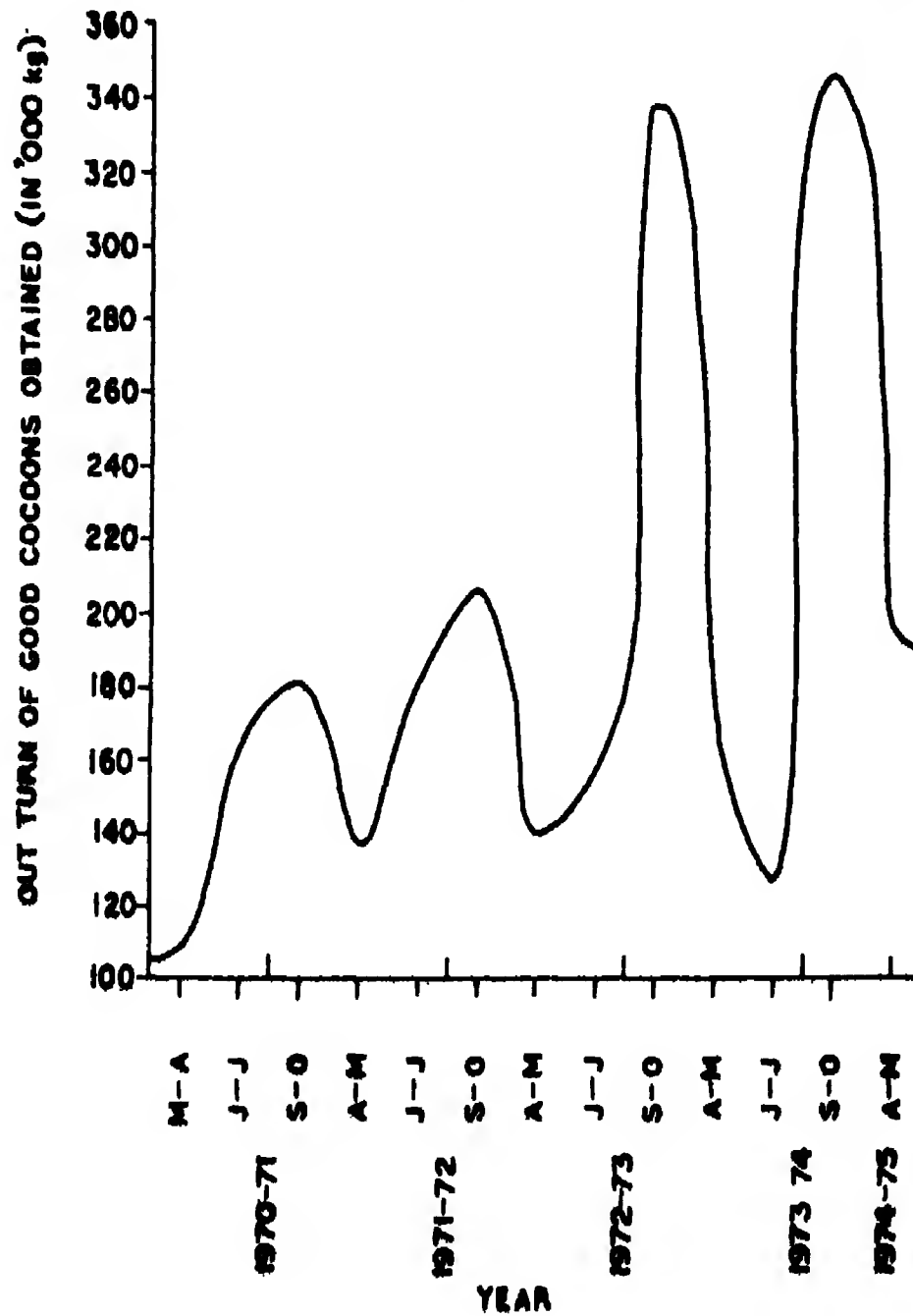


Fig. 24

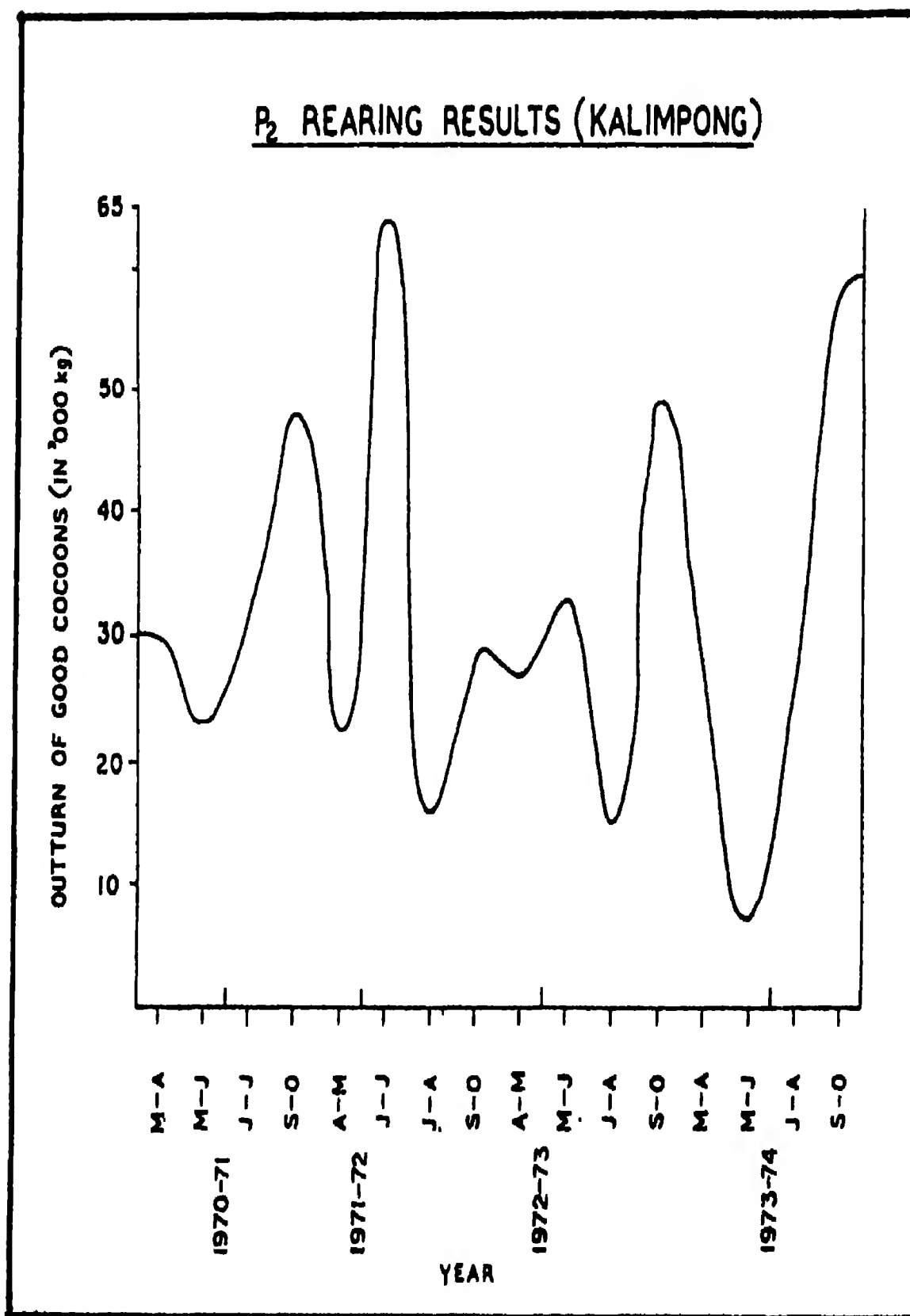


Fig. 25

April-May (50,757 Kg.) (Vide Figs. 23, 24 and 25).

The rearing results of P₂ cocoons in 'Foreign Seed Station' at Kalimpong record wide, monthly as well as annual fluctuations. The maximum outturn was recorded in 1970-71 (132, 730 Kg.). The monthly fluctuations of outturn between the two stations, i.e., Kalimpong and Kurseong is closely related to rainfall. At Kurseong, maximum yield is obtained prior to the onset of monsoon. Excessive humidity is harmful to cocoon rearing. Kurseong is situated in the southern slopes of Darjeeling Himalaya, receiving more than 4,000 mm. annual rainfall. But Kalimpong receives much less because of her leeward location. the variation between P₁ and P₂ rearing results at Kalimpong, may be attributed to both climatic and human factors.

Problems of Seed Production and Cocoon Rearing

The hill areas are facing several problems both in the cultivation of mulberry leaves, production of seed cocoons and their subsequent rearing. Some of the problems are noted below :-

- (a) Scarcity of leaves at the time of rearing.
- (b) Inadequate drainage and irrigation facilities.
- (c) Inadequate supply of planting materials for low-bush plantation, cutting requirements of which are indeed high.
- (d) Transport difficulties and increasing cost of transport.
- (e) Scarcity of labour.
- (f) Other socio-cultural problems.

In this non-traditional mulberry and silk producing region, there are various problems which hinder the expansion of mulberry area. It requires a good deal of persuasion to encourage the farmers to adopt sericulture in place of conventional farming. Sericulture being a specialised occupation, needs expert guidance and training which are not always available to the cultivators.

Besides, there are some other problems like :-

- i) Initial investment of capital/labour for the first two years without any financial return,
- ii) high capital investment to initiate trade (at least Rs.500.00 at the initial stage),
- iii) absence of proper organisation to undertake extension programmes,
- iv) problems of marketing the products of the hills.

It is difficult to bring the isolated sericulturists, living in the remote areas of the district, at a common platform. As a result, this region relies on Malda for marketing of her products. This entails additional transport cost.

In spite of such constraints and the political agitation of GNLf that has gripped the hill area since 1986, the area under mulberry has increased to about 1,000 hectare in 1987-88. During 1987-88 the Hill Areas Development Programme envisages to allocate Rs. 569,000.00 for sericultural development in the district.

Plans and Programmes

Under the Hill Development and Small Farmer Development Agency Programmes (SFDA), special emphasis has been paid on the development of sericulture in the region. At the initial stage, emphasis was given on seed production, but after the initiation of the above-mentioned programmes, commercial rearing has received good impetus. Special assistance is provided to the sericulturists in the form of supply of mulberry saplings and disease free layings. Financial assistance from the banks is easily available for the construction of rearing houses and in the purchase of rearing appliances. Disinfectants are also freely available to the mulberry cultivators.

Small Farmer Development Agency Programme : About 125 farmers have started mulberry cultivation since 1973-74 at Kalimpong, Bijanbari and Mirik. Provisions have been made for the setting up of 2 demonstration farms to cater to the needs of the cultivators, particularly for those living in the remote areas of the district. Unfortunately this portion of the programme has not yet been materialised. As a result no follow up action has been taken up in recent years. Out of 125 cultivators covered under the SFDA Programme, mulberry cultivation is carried by 24 people, who have taken up silk-worm rearing since 1975. It is, therefore, evident that extension programmes of mulberry cultivation and silk-worm rearing should be sufficiently strengthened to have the desired result. The task of extension works for the entire hill area lies in the hands of a few Assistant Inspectors and Demonstrators.

In the programme of bi-voltine and seed cocoon culture in the hill areas, there are provisions for setting up 2 servicing centres. These are meant to cater to the needs of the rearers, by imparting them with practical training to this new avocations, both in the culture of mulberry saplings and rearing and also encouraging them in rearing young silk-worms at early stage and its subsequent distribution to the rearers.

There is a provision for establishing a grainage for the preservation of disease-free layings. The production is estimated to be 300 Kg. per annum, which is to be supplied to other regions of the State. It is envisaged that the two State grainages and the one of the Hill Development Council will be able to supply about two-thirds of the total requirements of seed cocoons of the State. The present annual requirement of bi-voltine eggs in West Bengal is about 2,000 Kg. of which only 10% is being met from the internal resources. It has been estimated that during 1985 annual requirement would exceed 3,000 Kg., while the production can only be stepped up to 20% of the total.

Table 9.28

Proposals and achievements under the 5th Five Year Plan (1973-79)

Proposals	Achievements
With finances jointly by the Central and State Governments -	In 1974-75 land along with a double storeyed building was purchased at Pedong for setting up sericulture servicing units.
2. Setting up of 6 servicing units with demonstration farms covering the entire Darjeeling district.	2. In 1975-76 a demonstration farm has been set up at Kalimpong together with the cultivation of mulberry.
3. A tentative target of 390 ha. of land involving 17,000 entrepreneurs was earmarked.	3. In 1976-77 one more servicing unit and 2 demonstration farms have been set up at Bijanbari, Gitdabling and Takdah.

(Source: Directorate of Sericulture and Silk-Weaving, Kalimpong).

Integrated Annual Plan : For further promotion of sericulture in this hill region and to remove the existing socio-economic constraints, an integrated annual plan was chalked out in 1976-77. The chief objectives are i) supply of planting materials to the cultivators, ii) conversion of 45 ha. of land under mulberry cultivation for commercial production, iii) ensure production of 20,000 Kg. of seed cocoons and supply of 3 million bi-voltine layings annually, iv) help the cultivators of the hill areas with financial assistance @ Rs.4,000 per farmer with 0.20 ha. of mulberry land on 50% loan and 50% grant basis, v) create essential infra-structure for the production of 150,000 Kg. of reeling cocoons required for running one modern filature plant in the district, and vi) provide necessary technical

assistance to the cultivators for successful production of crops and help them in the disposal of their produce.

Since ecological as well as economic environment for the production of bi-voltine cocoon are favourable in this region, attention should be paid to multiply its production. The remote areas, however suffer from inadequate and poor transport facilities. Moreover, seed cocoons can neither be readily transported, nor the areas are ideally suited for commercial cocoon production, as cocoons cannot be easily marketed./ Another major problem retarding expansion is the institutional barrier. In the face of these multiple problems, it is extremely difficult to persuade the traditional farmers to accept a new avocation. It is well-know that success in sericulture can be achieved by sectoral adjustments and efficient marketing of the final products. A plan was accordingly drawn in 1977-78 keeping these aspects in view.

Table 9.29

Outline of an integrated plan (1977-78) for the development of sericulture in Darjeeling District

Outline	Impact
1. To bring about 121 ha. of land under mulberry and attract about 600 farmers under sericulture programme.	The production of 150,000 Kg. or reeling cocoons work about Rs.300,000.
2. During 1978-79, 141 ha. of additional land was proposed to cover under mulberry cultivation involving about 700 farmers.	About 1,500 persons are given employment indirectly and another 1,500 persons have been given self-employment.
3. Proposal for setting up one 100 basin failature.	

(Source : Directorate of Sericulture & Silk-Weaving, Kalimpong).

Change in Cultural Landscape

Recent introduction of sericulture in this non-traditional area has resulted in a significant change in the land use pattern and occupational structure of the population. The traditional farmers are taking up mulberry cultivation and silk-worm rearing as their subsidiary source of income. A large section of the seasonally unemployed farmers are provided with employment. In the tribal communities, the womenfolk are being more involved in silk spinning and weaving.

In the vicinity of Siliguri, a large area has been brought under sericulture near Matigara where a government grainage and seed farm have been constructed to help the sericulturists. Another composite unit covering an area of 123 hectare is being constructed at Ambari-Falakata in Jalpaiguri District by the State Government. The proposed unit is likely to function as an integrated one, covering the four sectors of sericultural operations like the cultivation of mulberry, rearing of silk-worm, reeling of the yarn and weaving of the fabrics. As mulberry can be grown on farms which are not particularly suitable for crop production, its cultivation does not interfere with the existing pattern of crop-land use. As such, these areas may offer higher potentialities in land utilisation. Moreover, mulberry cultivation can also be raised in dry farming techniques thereby entailing less investment. It may be said that if the tribal population of the region and those people who are engaged in miscellaneous works are drawn in this occupation, the region possesses the potentialities of further development. In the absence of any other industry, sericulture holds an excellent promise in this region. If minimum yield and maximum utilisation of seeds are ensured together with marketing facilities, sericulture possesses a bright future in the northern hills and foothills. This has been testified from the phenomenal success of the limited programmes of development undertaken so far in this region during the last 10 years or so.

vi) Jalpaiguri - A centre for the Revival of Eri Silk

Introduction

Eri is a type of non-mulberry sericulture. The host plant is castor and the silk-worm is eri (*Philosamia ricini*). Eri culture is similar to that of mulberry culture, only the host plant and the moth are different in nature. Eri worms are domesticated like mulberry silk-worms and are reared indoor.

Eri culture is presently confined in Jalpaiguri and Coochbehar districts of North Bengal. The eri rearers are highly scattered in these districts. This is practised as a subsidiary occupation secondary to systematic agriculture, but it functions as a cottage industry. The production of eri fabrics has not yet been commercialised. The fabrics produced are usually consumed locally. At present, the production of eri yarn is 6,000 Kg. and the fabric production is 72,00 m. The persons employed in this sector have been roughly estimated as 1,000 - 1,500.

In North Bengal, rearing of eri cocoons, its production and subsequent processing are confined among the tribal communities of the 'Mech' and 'Coch'. But eri culture is not flourished to the same extent as in the adjoining

districts of Assam. During the colonial period, the British patrons attempted to commercialise eri culture but their efforts were not successful. Since then, it has managed to survive in its way, but has not yet become an economic enterprise.

Even after independence also, no efforts have been made to revive eri culture in North Bengal. From 1979, onwards the Lutheran World Service has taken particular initiative to revive eri culture in Jalpaiguri with special care to make it economically viable as a cottage industry. As a result, people have become interested in it, particularly because it provides part-time employment to the tribal women-folk, who are otherwise engaged in agriculture. Moreover, this has proved to be an additional source of income to the people.

Geographical Environment

The geographical environment of Jalpaiguri and Coochbehar districts are similar to that of the adjoining districts of Goalpara and Kamrup in Assam. The region is having a mean annual temperature of 28°C-30°C, an annual average rainfall of 3,300 to 3,400 mm. and an average relative humidity of 74% throughout the year.

Ecological Range of Eri-Worm (*Philosamia ricini*)

Eri-worms thrive best under a high temperature (18°C) and high humidity (75-95%) during the rearing period. During the spinning season the temperature should be slightly higher (26°C-29°C). However, the rearing period can be adjusted with micro-climatic variations in different regions.

Habitat of Castor Plants and Eri-Worms

Usually, the sub-montane hilly areas are congenial for eri-worms. The chief eri-worms are thrived on castor leaves. But some species of eri-worms are polyphytophagous in nature and feed on varieties of other plant leaves belonging to *Euphorbiaceae* family. These host-plants are Kesseru (*Heteropanax fragrans*), Topioca (*Manihot utilissima*), Bhotera (*Jatropha curcas*) etc. The domesticated variety of eri-worm (*Philosamia ricini*) is multivoltine in nature and therefore can be reared throughout the year. These worms when fed on castor plants give a higher silk ratio than in case of other plants. The eri-worms belong to *Saturniidae* family. Of all the non-mulberry varieties, eri-worms are the only domesticated types.

The castor plants are generally grown upto an altitude of 1200 m. These plants need well drained surface for healthy growth. It can thrive in temperature ranging between 15°C - 35°C. In Jalpaiguri district, the castor plants, are grown in a wild state. Castor plants, however, give higher yield rate if planted. So, a number of experimental farms have become interested in castor plantation. At Chekamari village in Madarihat police station, a

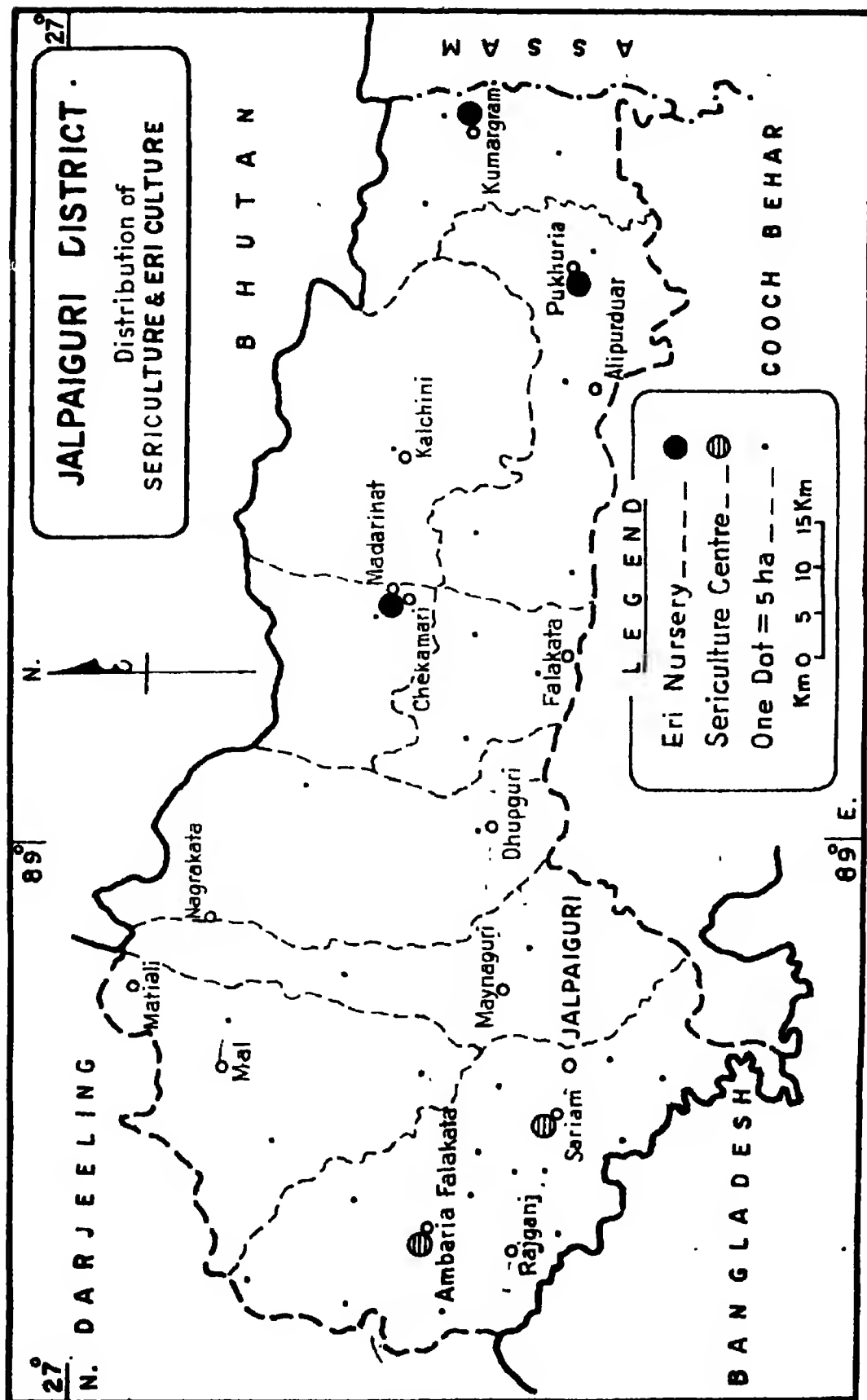


Fig. 26

co-operative society has taken up this venture. Generally, the plants are grown adjacent to the farmsteads, along the roadsides of the villages and as fences of farmyards.

Castor plants prefer sandy loam and loamy soils. If planted, it requires regular manuring and pruning. Irrigation becomes necessary from November/December to April/May.

Spatial Distribution

The main areas of concentration of eri-culture are Madarihat, Alipurduar and Kumargram P.S. in Jalpaiguri District (Vide Fig. 26).

Eri-culture is usually practised by the tribals which has become a way of their life in this trait. The tribals are also in the habit of taking eri-moths as delicacy. During the drought season when there is food shortage, eri cocoons supply a substantial portion of their nutrition. The pupae-oil, extracted from the moth is used for domestic purposes. The tribal women prefer to wear home-made fabrics. This gives incentives in spinning eri-yarn and weaving of eri-fabrics as a part of their social and religious custom.

Difficulties in transport and lack of proper market facilities often act as deterrents to its localisation. North Bengal was left relatively isolated from the southern part of the State prior to the construction of Farakka Barrage. Therefore, market was not well developed as in case of the adjoining Brahmaputra Valley. As such, eri-culture remains, spinning and weaving of eri-fabrics have remained localised in only 7 villages. It is difficult to estimate the exact number of farmers. But expansion of eri-culture is in progress in recent years.

Table 9.30

Spatial distribution of eri culture in Jalpaiguri District, 1981

Name of P.S.	Name of the village	Number of rearers (estimated)
Alipurduar	1. Birpara	1,000
	2. Mahakalguri	
	3. Pukhuria	
	4. Shamuktala	
Kumargram	1. Barabisa	Not estimated
	2. Kamakhyaguri	
Madarihat	1. Chekamari	30

(Source: Field Survey at Chekamari Village, Madarihat P.S., 1981)

The number of eri cocoon rearers have decreased significantly during the last two or three decades. In 1972, the number of rearers was estimated

at 1,140 in Jalpaiguri and 190 in Coochbehar district (Ref. Lead Bank Survey Report, 1972).

The role of LWS in the expansion of ericulture within the villagers of the area is praiseworthy. This welfare organisation has become successful in creating interest within the tribals, by trial experiments thereby disseminating the scientific techniques of eri-culture within them. Coochbehar District, however, lags far behind in adopting eri-culture, though ecological conditions are congenial for its introduction. The State Directorate of Sericulture is now taking initiatives in this matter and has opened up an office at Coochbehar, after being encouraged by the activities of LWS. But till now nothing significant has been achieved. Contextually it may be mentioned that the social-cultural attributes of the tribals act as a more dominant force in the localisation process, rather than geo-economic attributes.

Economics of Eri-Culture

From the field survey conducted at Madarihat, a rough estimation of economics of eri-culture has been worked out.

A castor plant can usually give 5-6 harvests in a year. The harvesting seasons of castor plants are:

- 1) March – April
- 2) June – July
- 3) August – September
- 4) October – November
- 5) December – January

The yield of leaf per plant is 5 Kg. Therefore, the total leaf yield per plant can be estimated at 25-30 Kg. per annum. However, in the absence of systematic plantations the yield rate is much less. The rate varies from village to village depending on the number of plants grown in scattered locations. It has been estimated that for rearing 1 Kg. of cocoon it is necessary to have eggs from 30 eri moths which again require about 40 Kg. of castor leaves for healthy growth.

The average cocoon production per harvest has been estimated at 3 Kg. Therefore average annual production comes to 15 kg. The sale price of cocoons is Rs. 25 per Kg. Therefore, 15 Kg. of cocoon fetch a price of Rs. 375/- in the open market.

The fabrics, however, are seldom sold. These are mostly used for domestic purposes. In order to make eri-culture economically viable, market organisation needs to be geared up.

Table 9.31

Cost benefit analysis of eri silk fabrics under organised sector in
Jalpaiguri, 1982.

Per 3 m. of fabrics requiring 800 gms. of yarn as
raw-material

Items of Expenditure	Value (Rs.)
Cost of 800 gms. of yarn	20.00
Requirement of Soda for boiling	1.00
Spinning wage	25.00
Weaving wage	30.00
Total cost	76.00
Sale value	50.00 to 130.00
Net profit	54.00

(Source: Compiled from the field studies conducted at Madarihat,
Jalpaiguri District).

Case Study- Chekamari, a Tribal Village (Madarihat P.S.)

Because of the intensive efforts of the Lutheran World Service in systematic eri-culture at Chekamari village, this village has been particularly selected for case study. The village is located at a distance of 1½ Km. west of Madarihat.

This is a traditional tribal village where rearing of eri-worms and subsequent spinning and weaving activities are carried on by the 'Mech' community, particularly by the womenfolk, throughout the year. The approximate number of rearers are 30. The castor trees are usually grown in natural state and recently castor farming is also being practised on this village. The castor fields are usually located adjacent to the farmsteads of the eri-worm rearers.

Methods of Rearing : Rearing is usually carried in trays. But with introduction of the improved methods, the worms are shifted to shelves from the second stage of their life cycle and are hanged from the wooden rods. The mortality rate of the worms reared in trays is higher because the trays are not periodically cleaned. This system of rearing needs careful supervision. At Madarihat, an eri-cocoon centre is operated by the LWS. The main function of the institution is to propagate eri-seeds for the villagers of the surrounding region. There is a co-operative society at Chekamari which procures the cocoons from the villagers giving them a price of Rs. 25 to Rs. 30 per Kg. There are wage employees under the institution who are engaged in spinning works. The wage rate is determined on piece-rate work. For example, the wage rate is fixed at Rs. 25 for spinning 1 Kg. of

yarn. Usually the woven fabrics are 'shawl' locally known as 'Chaddar', used by men and women.

It takes about 4-5 days time for spinning 1 kg. of yarn, similarly for weaving 1 piece of shawl (1½ m.), the same time is required. A primitive method of hand spinning with 'Takli' (a wooden implement,) is also prevalent here. About 100-250 gm. of yarn can be spun in a day. When spun in paddle Charkha, the yield rate increases to 400 gm. per day. The eri-cocoons cannot be reeled because most of them are pierced.

The wage rate for weaving is fixed at Rs. 30 per piece of fabric. The sale value of a shawl varies between Rs. 50-Rs.130 depending on the quality.

There are about 15 households which are engaged in weaving in this village. On an average, 3 persons are engaged per household in various stages of weaving operation. The average production rate is 3 pieces of shawl (4.5 m.) per loom per month. Therefore, the average income per weaver comes to about Rs. 90.

The weavers work in their domestic looms. Consequently there are no salaried weavers as in case of Murshidabad and Birbhum districts in West Bengal.

The eri-fabrics are usually not dyed. There are three categories of shawls: 1) The plain shawl with cost ranging between Rs. 50-Rs. 65 per piece. 2) the special shawl costing Rs. 80 per piece, and 3) Gent's shawl having higher cost amounting to about Rs. 100 – Rs. 130 per piece.

The shawls are sold to the people coming down from adjoining states of Nepal and Bhutan. In Bihar, these shawls have a good demand. Prior to 1962, a substantial portion of the fabrics was diverted to Tibet. Since then, the trade with Tibet has stopped and as such the fabrics are now consumed locally.

Impact of Eri-Culture on Cultural Landscape

It is worthwhile to mention that due to rehabilitation programmes undertaken by the Lutheran World Service and the State Government, the underdeveloped rural economy of Jalpaiguri and Coochbehar districts is being revived. The rural people have realised the importance and economic feasibility of eri-culture as a cottage industry. However, feasibility of its commercial development, is yet to be achieved. This is best suited as a part-time occupation because it involves a greater number of man-days. In view of the high wage rate of labourers, large-scale commercialisation of eri-culture at this stage appears to be a costly proposition.

Future Outlook

This region possesses excellent viability for the development of eri-culture as a subsidiary cottage industry.

The castor plants do not require large investment in preparation and maintenance of land. Usually the fallow lands which are slightly elevated are used for castor plantation. There is no need for soil treatment or large-scale irrigation, for its farming. Therefore, the cost of cultivation is practically negligible. If this sector is made economically viable by diffusing the rearing techniques within the villagers and marketing facilities are improved, the cri-culture will certainly become an economic endeavour of the local people.

Vii) Purulia - A Typical Centre of Tasar Silk

Introduction

Lying in the close proximity to Ranchi-Hazaribagh region, which happens to be the important tasar producing centre of India par excellence-Raghunathpur-Purulia forms the eighth major sericulture zone of West Bengal. This is an exclusively tasar region where weaving of tasar fabrics is predominant over the allied activities associated with sericulture, i.e., rearing and reeling. This region caters to the need of tasar silk fabric consumption of the adjoining industrial region of Ranchi, Jamshedpur and Sindhri. About 50% of the total sale of fabrics is carried at Raghunathpur itself.

History of Tasar Culture

Tasar cocoons are traditionally raised by the tribal people living at peripheral regions of Chotanagpur plateau and adjoining areas since very early days.

Tasar culture is a traditional occupation amongst the tribals of Purulia. However, in the course of last three or four decades or so, tasar culture and raising of tasar seed cocoons of this district are on the decline. The contributing factor for such a decline is the progressive depletion of the forest wealth of the district with a corresponding decrease of the tasar host plants. Progressive deforestation is the outcome of the traditional practice of shifting cultivation resulting in destruction of forest areas without any measures for their subsequent regeneration. Due to this recent trend of deforestation, Forest Department of the State is not particularly interested to render necessary facilities to the local tribals for tasar culture. As such there is a need for closer co-operation between the Forest Department with the Department of Sericulture of the state. Unless the tasar host-plants are raised in a systematic way in the forests and the tribals are permitted to resort to tasar culture in them in a systematic manner, the shortage of tasar cocoons in the State cannot be supplemented. Moreover, it is suggested that the practice of seed collection from the existing forest areas by the tribals should be more organised. In this connection it may not be out of

point to mention that tasar seed collection and subsequent of worms have become a rhythm of tribal culture in Purulia district since the historical period. Therefore, the tribals (i.e., Santhals, Bhumij, Munda etc.) need greater persuasion and encouragement to adopt improved methods of tasar rearing recently introduced by 'Tasar Research Station'. Hence, it would be more fruitful if these tribals are allowed to continue their practices with greater organisation facilities. Because of the intervention of middlemen, the seed collectors are sometimes forced to make distress sale, without getting proper remuneration. This situation creates an apathy among the tribals and consequently they have now become reluctant to adhere to their traditional practice of seed collection and seek for other occupation where the chances of getting higher return are bright.

Under the circumstances, technology transfer appears to be a difficult task in this particular region because of historical, traditional and socio-economic momentum in which the tribal population of this area are engaged in such occupation. Spread of education and meaningful extension services are needed to achieve this objective.

The problem of raw-material shortage, however, needs to be sorted out very carefully, as it is creating a serious bottleneck and threatening the very existence of tasar culture in West Bengal.

Habitat of Tasar Silk-worms

The tasar silk-worm is the most important source of natural silk (non-mulberry group) found in India. The common variety of tasar-silk worms which thrive under tropical conditions is *Antheraea mylitta* D. It is found in a wild state in the forests of the peninsular India, covering extensive areas of central and eastern India. The tasar region, therefore, lies between the Ganga in the north, the Godavari in the south, Midnapore in the east and the Narmada river in the west. In Bengal, tasar silk was known much before the introduction of mulberry silk. The ecological conditions under which the worms thrive best are typical of tropical climate combined with a heavy rainfall, high temperature and a moderately high humidity. However, prolonged drought or excessive rain during spinning seasons result in high mortality of the worms.

Optimum Temperature and Humidity: The absolute climatic range in which *Antheraea mylitta* worms thrive is noted below:

The temperature varies between 11° C to 37° C. The annual precipitation is around 1,300mm. and the relative humidity about 60%.

Of the major eco-race of *A. mylitta* there are several varieties having commercial significance. The most common high yielding varieties are 'Daba' and 'Bogoi', while the low yielding varieties include 'Laria' and 'Tira',

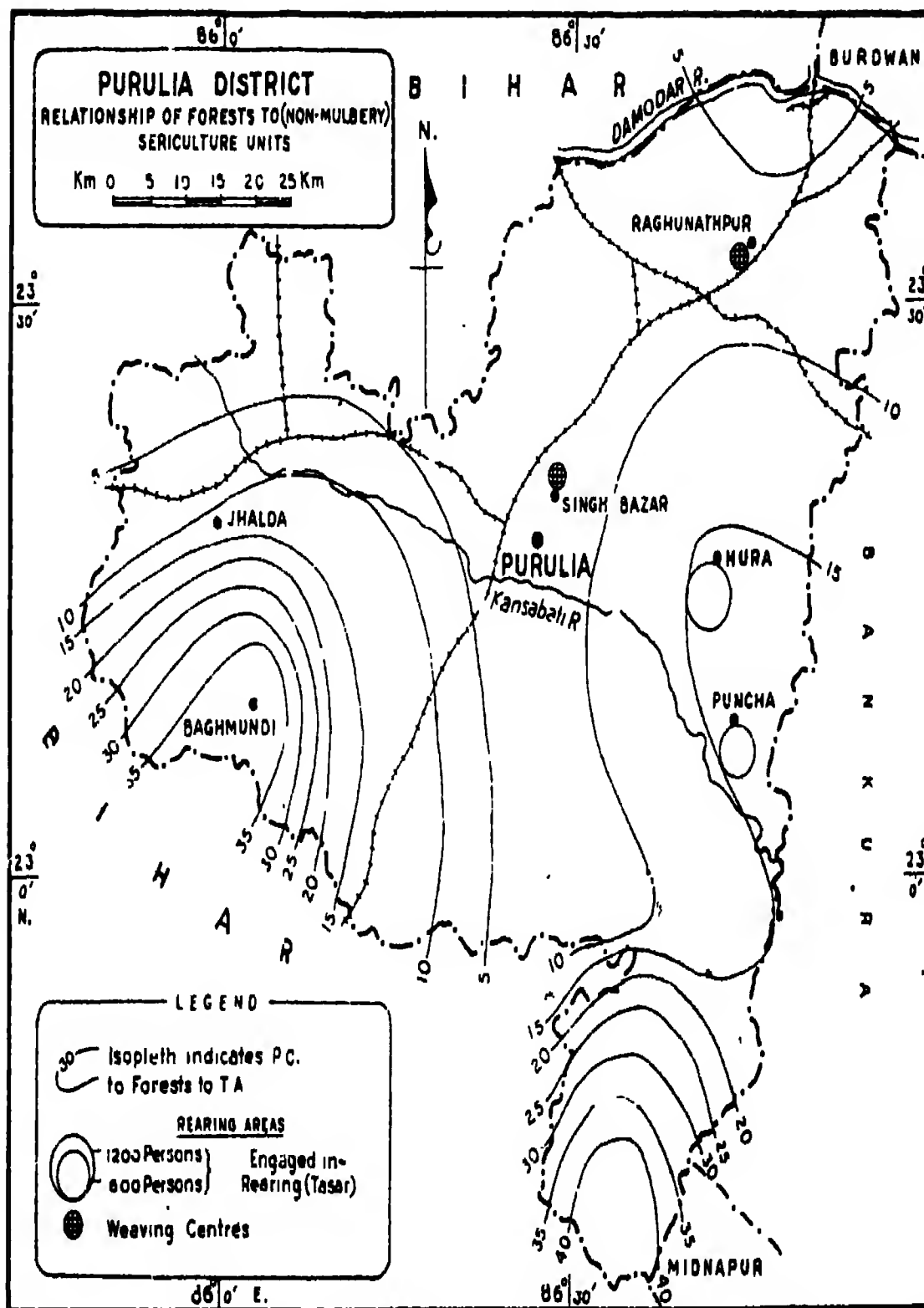


Fig. 27

the last one being indigenous of Bankura and Purulia. However, since West Bengal imports all its tasar cocoons from Bihar and Orissa, all the four varieties mentioned above are used for reeling and spinning purposes.

Host Plants of Tasar: The host plants on which tasar worms thrive are 'Sal' (*Shorea robusta*), 'Asan' (*Terminalia tomentosa*), 'Arjun' (*Terminalia arjun*) and 'Sidha' (*Lagerstroemia parviflora*), the last one being prevalent in Bankura and adjoining areas.

A. mylitta, due to its polyphytophagous nature has established itself on a variety of host plants in different ecological set-up. Experiments conducted by Central Tasar Research Station, however, testify that 'Asan' tree is a superior host plant than others in respect of yield. The effective rearing rate (E.R.R.) of Asan is high being 60.2%, whereas the E.R.R. of Sidha trees is only 4.0%. In case of Sal fed tasar cocoons, the quality is superior but the yield is very poor which hinders its commercial exploitation.

Spatial Distribution of Forest Resources

In connection with tasar rearing, a species wise spatial distribution of forest resources of the district may be of interest to note.

The forests of this district have been under private management for a long time which has resulted in unregulated felling of trees as well as their rapid denudation. Much of the forest areas of the district have now been cleared, except in the extreme north and in the extreme south around the Ayodhya and Baghmundi hills.

From Table 9.32 it is evident that the highest percentage of forest occurs at Banduan, being followed by Baghmundi (vide Fig. 27). At Pancha and

Table 9.32

Percentage of forest area to total area in Purulia District, 1971

Name of P.S.	Total area (ha.)	Forest area (ha.)	Percentage of forests to total area
Jhalda	57,951	5,004	8.63
Jaipur	22,908	999	4.36
Arsha	37,732	4,051	10.73
Baghmundi	43,154	16,117	37.34
Bolarampur	29,293	3,093	10.56
Barabazar	42,363	1,900	4.48
Purulia Muffasil	59,167	1,290	2.16
Para	32,438	924	2.86
Raghunathpur	46,466	644	1.38

Table 9.32 (Contd.)

Name of P.S.	Total area (ha.)	1st area (ha.)	Percentage of forests to total area
Neturia	20,487	1,476	7.20
Santuri	18,035	—	—
Kashipur	44,166	4,161	9.42
Hura	38,182	4,321	11.31
Puncha	39,225	5,252	13.39
Manbazar	54,067	5,943	10.99
Banduan	34,454	13,934	40.44

(Source: Census of India - Purulia District Handbook, 1971).

Hura P.S. where most of the rearing operations are carried on at present, have moderate forest areas, viz, 11.14% of their area.

Types of Species : The forests of Purulia show wide varieties of species. For example, i) Koilapal zone is noted for sal trees, ii) Jhalda-Baghmundi-Matha zone for Sal and miscellaneous trees, iii) Kalma-Sinni zone for Sal on the ridges and miscellaneous trees including bamboo elsewhere, and iv) the central rolling plain and undulating plateau face for sal and miscellaneous trees.

In the bare tracts of Raghunathpur, there are scattered hillocks with poor to moderate forest cover. At Raghunathpur, the important species grown are Akashmani, Eucalyptus and Arjun. Of these Arjun covers about 5% of the total forest area.

Rearing of Tasar Cocoons

At present there is no large-scale commercial rearing of tasar cocoons in Purulia district. At Raghunathpur, however, there is one pilot project, viz., 'Tasar Seed Supply Station' where 'Daba' and 'Tira' varieties of cocoons are reared in the adjoining plantation area of Asan and Arjun trees owned by the institution. The main objective of this unit is to raise seed cocoons and to supply disease-free layings to commercial rearers of Puncha and Huru Police stations. There are approximately 687 tasar cocoon rearers at Puncha P.S. and 1,042 rearers at Hura P.S., from where about 80-90kg. of tasar cocoons are now produced per year. But in favourable years as in 1976-77, the production of tasar cocoons may be as high as 600 kg.

Economic Factors

Weaving of tasar fabrics at Raghunathpur is facilitated due to various locational advantages. The art of tasar weaving is well known to the Caste-Hindus of the area since the historical period. Previously tasar

cocoons were obtained from Chaibasa and Singhbhum in Bihar and adjoining areas of Orissa. This region lies in close proximity to Bhagalpur, a well-known tasar centre of India where the techniques of dyeing and printing have been developed from an early date. Prior to independence, a substantial portion of the woven fabrics were sent to Bhagalpur for dyeing and printing. Even at present, some fabrics are sent to Bhagalpur for finishing. However, bulk of the fabrics are now processed at Raghunathpur itself. The area commands a good market for tasar fabrics and supplies the same to the adjoining industrial belt of Bihar and West Bengal.

Case Study of Raghunathpur - A Traditional Weaving Centre

At present weaving is concentrated in two regions, namely at Raghunathpur and Singhbazar. The total number of looms are 94 in the entire district. However, Raghunathpur is the main centre of weaving with 80 looms. Weaving is carried by individual weavers as well as by the co-operative society. The average annual production of fabrics is around 50,000 metres. Under the organised sector, there are two silk co-operative societies-one located, at Raghunathpur and the other at Singhbazar. At Raghunathpur, there are about 25 looms under the co-operative society and the others are owned by individual weavers. The employees of the society are daily-wage weavers. The Society procures cocoons from the 'Raw-Material Bank' and also from private traders at the rate of Rs. 355/- and Rs. 240/-per Kahan, i.e. Rs. 325/- and Rs.220/- per kg. respectively.

The weaving process is entirely traditional. The work is dominated by women. The average rate of production per weaver per month is 55 m. for which about 800 to 1,200 kg. of cocoons are necessary, depending on the quality. Daba cocoons yield greater quantity of yarn and are also of superior quality. Therefore, the requirement is less in this variety. An individual loom, on an average employs 5 persons, including spinners and weavers. Wide varieties of fabrics are woven in these looms (Vide Table 9.33).

Table 9.33

Wage rate of different categories of fabrics woven at the co-operative society at Raghunathpur, 1981

Categories of fabrics produced	Size (m x cm)	Wage Rate (Rs.)	Sale Value (Rs.)
Pure Tasar	11 x 90		
	a) 80 reed	40	357
	b) 72 reed	35	

Table 9.33 (Contd.)

Categories of fabrics produced	Size (m x cm)	Wage Rate (Rs.)	Sale Value (Rs.)
Tasar Sarce	11 x 1.16 (72 reed)	62	190-200
Bafta Shirting	a) 100 count	37	247
	b) 80 count	33	225
	c) 60 count	30	214
	d) 40 count	37	203
Matka Shirting			
a) Angabashtra	11 x 90	28	
b) Tasar Matka shirting	11 x 90	33	357

(Source: Raghunathpur Silk-weaver's Co-operative Society).

The yarn requirement per month for pure tasar fabric is 3.5 kg. valued at Rs. 875/- while that of 'Kete (waste of tasar) is 6 kg. and 250 gm. valued at Rs. 780/-. The requirement of matka yarn per month is about 5 kg. valued at Rs. 700/-.

The average income per month per weaver varies from Rs. 150/- to Rs. 300/-, depending on the category of fabric woven by the weaver. The total number of weavers in the district are about 400. The society is financed by the State Government and also by United Bank of India. About 50% of the finished fabrics is sold at Raghunathpur and the rest goes to various places of India in Calcutta, Madras, Andhra Pradesh and others.

Private Sector: System of Operation

Weaving under the private sector is carried under the patronage of mahajans or traders. In most of the cases it is found that, these mahajans/traders were previously operating as master weavers for quite a number of years. This kind of knowledge in the technique of weaving helps in conducting the business more efficiently. In this region the wealthy traders have about 30 wage-weavers in their pay roll. The others have about 20 wage weavers working under them. In Purulia district, there are two such big traders and three small traders who operate on a 'Dadan System'. Under this system, an advance of both raw-material, i.e., yarn and part of the wages are given as advance to the wage weavers. The cocoons are usually purchased from Chaibasa and Chakulia. There are approximately 40-50 spinners. From 1 Kahan or 1,100 gm. of 'Daba' cocoon about 1,200 to 1,500 gm. of yarn can be obtained.

The wage rate for spinning is Rs.50/- per Kahan but the 'latha' which is a waste product in spinning becomes the property of the spinner. The recovery rate of 'latha' is usually about 500 to 600 gms. from one Kahan or 1,100gm. of cocoon, the sale value of which comes to about Rs.70/-to Rs.80/- per kg.

The production of wastes is about 100 gm. per day per spinner. The average income comes to about Rs. 50/-per Kahan.

A detailed comparative analysis of the cost structure reveals that there is a wide range of price differential between the two, although the category and the size are the same. The price of finished fabrics is somewhat higher in the co-operative sector except in case of tasar sarees, the price of which is low. The wages are also high under the co-operative sector. It is desirable that increasingly large number of weavers should be brought under the organised sector. This will result in greater wage ratio and increased production efficiency.

Table 9.34

Wage rate, break-up cost, and final cost of different categories of fabrics produced under the private sector at Raghunathpur, 1981

Categories of fabrics	Size (m x cm)	Weaving wage (Rs.)	Yarn price & Miscellaneous Charges (Rs.)	Cost Price (Rs.)	Sale Value (Rs.)
Pure tasar shirting	11 x 90	30-35	180 + 10	225	250
Pure Tasar sarce	11 x 1.15	50-60	210 + 12	272	300
Tasar x ketc Shirting	11 x 90	30-35	292 + 12	334	350
Tasar x Matka Shirting	11 x 90	30-35	215 + 10	255	280
Tasar x jhute Shirting	11 x 90	30-35	175 + 10	215	220
Bafta	11 x 90	30-40	95 + 10	135	180

(Source : Private Communication, Dharma Das, Raghunathpur, 1981).

Conclusion :

A clear picture emerges from the study as to the present state of tasar culture in Purulia. Originally a tribal practice, the tasar culture and weaving have now become an object of commercial significance providing a subsidiary source of income and employment to the rural population and catering to the export needs.

However, the basic problem is the absence of an organised raw-material base resulting in lack of seeds from local sources. The present consumption of tasar fabric is at least four times than that of the local supply of cocoons and yarn. Therefore, the development strategy would be to create facilities for commercial seed supply and new plantation of tasar host plants. In this respect the collaboration from various government departments seems to be essential. The second step in the field of production is to organise credit facilities from various banking institutions. In this respect, Purulia still remains backward. Apart from two co-operative societies, there are no other organised weaving institutions in the district. The investment from various banks has been practically negligible because the institutions are not taking viable interests for its development. In no case, the average income of weavers exceeds Rs.300/- per month. Although the infra-structural facilities, i.e., availability of skilled labour, presence of a market and a good transport linkage with the surrounding region exist the region has been generally neglected. In tasar culture, Purulia- Raghunathpur region possesses immense viability. It can be functionally linked with the Ranchi-Chaibasa tasar tract on the one hand and Mayurbhanj-Keonjhar region on the other. The added locational advantage of Raghunathpur-Purulia is that, it possesses a superior weaving technology than the other two regions. Therefore, the former can be complimentary to the other two regions in respect of production and marketing of woven fabrics. If the capital in-flow and trade pattern are organised, the region has the viability of being the pioneering tasar producing tract of India.

CHAPTER X

DIFFUSION PROCESSES AND EXPANSION OF SERICULTURE

Nature of Diffusion

The Ganga-Mahananda interfluvium, covering the districts of Malda, Murshidabad and parts of northern Birbhum is considered to be the typical mulberry tract of West Bengal. Besides mulberry, culture of non-mulberry silk, particularly tasar, is carried by the tribals of Purulia, Bankura, Birbhum and Midnapore districts of the State.

After independence, mulberry culture is gradually spreading in new areas, partly due to initiatives of the government and partly through the activities of some welfare organisations. As a result, a slow process of diffusion is discernible in the various sectors of sericulture in the State.

The State Government has taken initiative in the form of extension services for better propagation of mulberry and non-mulberry silk culture amongst the traditional farmers of northern as well as western region. The selected areas of the north are the districts of West Dinajpur, Jalpaiguri, Coochbehar and Darjeeling, while in the west particular attention has been focused to the southern portion of Birbhum district, northern portion of Bankura district and a few isolated areas of Purulia district, i.e., Jhalda, Ladurka, etc. (Vide Fig. 5). In these areas government is providing subsidies and other financial assistance through banks to the rural people for sericulture. Several demonstration farms have been set up for the purpose and technical guidance is provided. The infra-structural facilities provided for the purpose include supply of mulberry cuttings/grafts for mulberry farming, arrangement of irrigation water to mulberry farms, supply of disease-free layings to the people for the rearing of cocoons, assistance to small reeling units, supply of handlooms to the loomless weavers and strengthening the marketing organisations. These are being provided by the government as well as by non-government institutions.

It may be mentioned in this connection that the motives of government and non-government organisations are somewhat different. The principal objective of the voluntary organisations is to provide some relief to the backward and poor marginal farmers of the rural areas to make them self-reliant by such subsidiary occupations.

The chief aims of the State Government on the other hand are to increase the area under mulberry and to expedite production of good quality cocoons so that the quality of silk yarn is improved. In other words, the State

Government launched an all-out effort to achieve an overall development in different sectors of sericulture. Incidentally the areas selected for the purpose are found to be ecologically viable. At the initial stage, the process was carried on an experimental basis. Emphasis has not been particularly paid on the commercial expansion and widespread marketing of the finished product. However, it is visualised that eventually these non-traditional areas will become commercial producers, if the process of diffusion is sustained for another 10 years or so.

Pattern of Diffusion in Northern Region

The pattern of diffusion, however, differs from region to region. The pattern of diffusion in the northern districts has not followed the classical characteristics of innovation diffusion. The main centre from which the spread effect has started is Malda. It is evident from the differential rate of extension of mulberry areas both in West Dinajpur and Darjeeling districts (Vide Figs. 28, 29 & 30) that distance might be one of factors for slower rate of expansion in Darjeeling district. However, in the hill region terrain pattern is also the chief constraint for areal expansion.

From the cumulative percentage curve of adopters of the Darjeeling district (Vide Fig. 31), it becomes apparent that the classical S-shaped logistic curve is still at the formative stage. The number of adopters are gradually increasing. The saturation point is yet to be reached from where the 'laggard' starts. It only substantiates the fact, that maximum utilisation of the possibilities is yet to be achieved.

The dissemination process in these two districts has been initiated from 1973-74. The diffusion process is still at its preliminary stage. In the beginning, the reelers and weavers had to be brought from Malda. Even at present, the artisans of non-traditional areas are mostly migrant sericulturists. In some places migration has been endogenic. The art of silk-worm rearing and reeling require such ingenuity of skill that it takes generations to achieve a minimum level of efficiency. This constraint has been somewhat modified by the spread of technical education amongst the innovators. At present people are trained at sericulture institutes as apprentice. The people, however, are adopting the techniques of rearing with relative ease.

Productivity of Non-Traditional Regions

Adequate marketing facilities and location in remote areas are additional reasons of slow spread effect. In Darjeeling district the total production of bi-voltine cocoon was 80,000 Kg. in 1981, while in Jalpaiguri district, the production of indigenous cocoon (nistari) in the same year was estimated as 79,000 Kg. Therefore it could be stated that further development in this direction may prove to be fruit ful as productivity of the region is high.

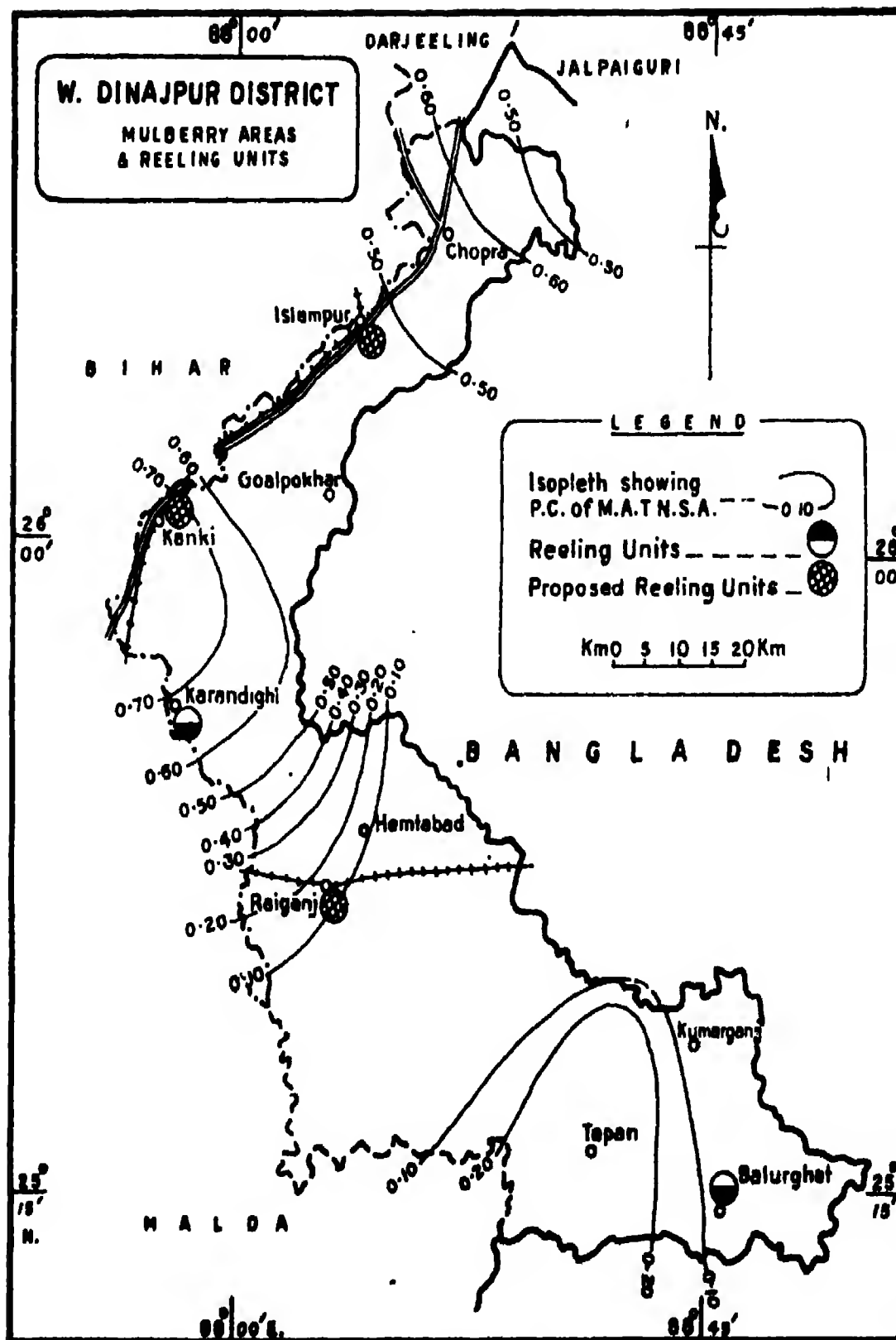


Fig. 28

WEST DINAJPUR LOGISTIC CURVE (S-SHAPED) OF INNOVATION ADOPTION

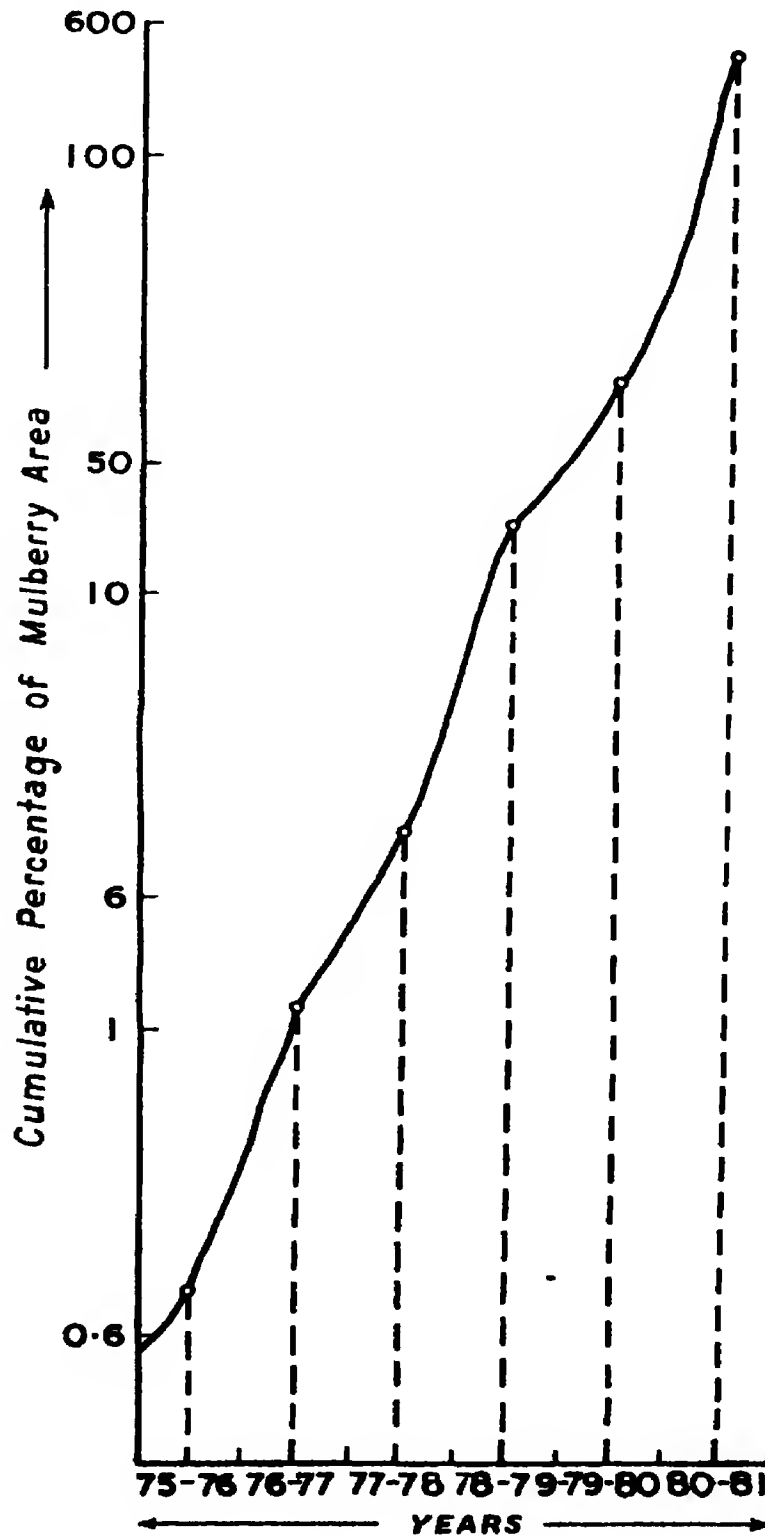


Fig. 29

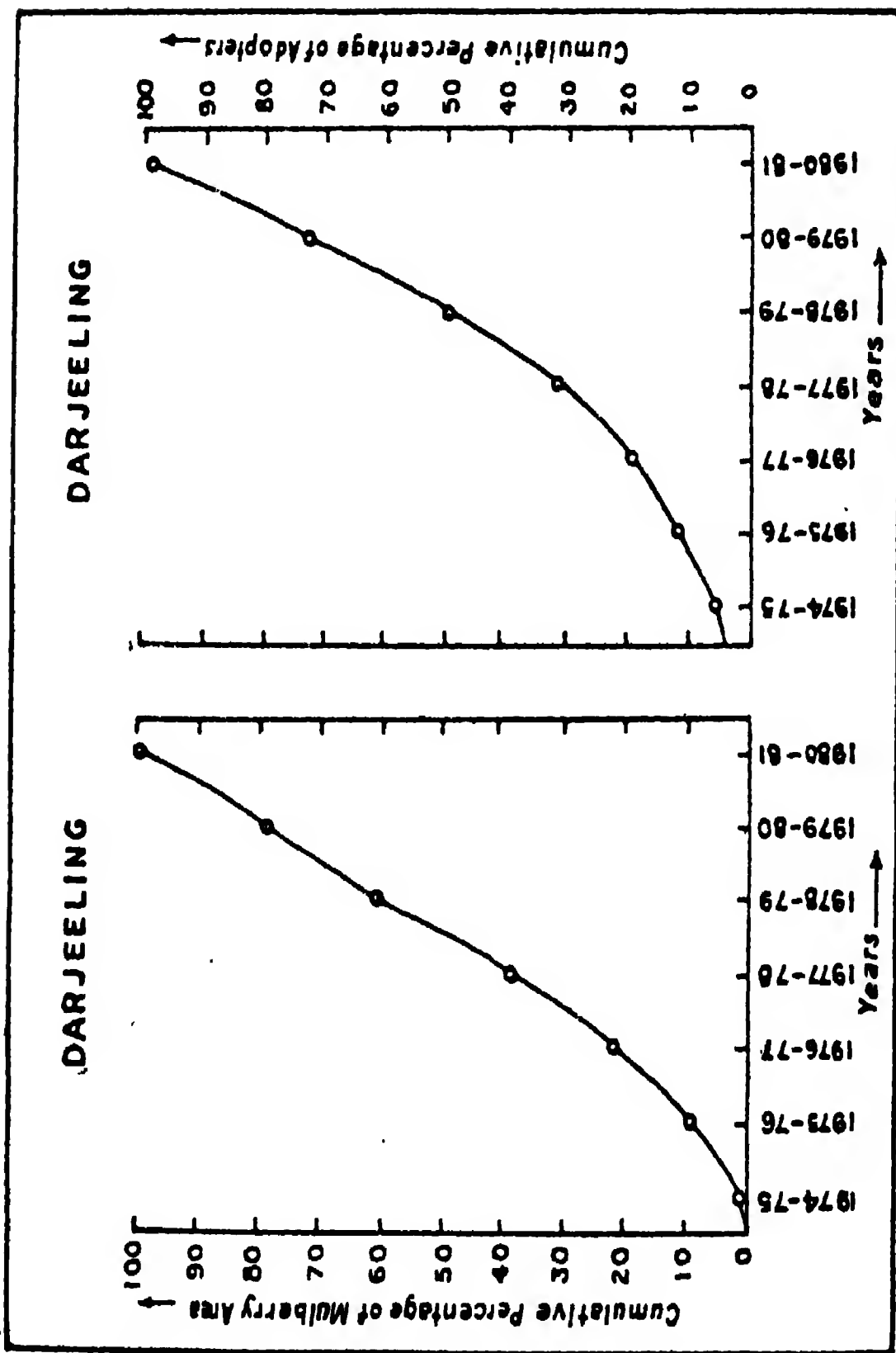


Fig. 30+31

Impact of New Experimental Stations

In the northern hills, experimental stations have been set up at Pedong, Takdah, Gidabling, Bijanbari and Mirik. These have become micro units for innovation diffusion. The surrounding villages adjoining these centres are quicker to adopt sericulture, because of the facility of technical guidance. In the foot-hill region, the important sericulture centres are at Matigara, Ambari-Falakata, Sariam, Madarihat, Pukhuria, Kumargram and Coochbehar.

In these areas non-mulberry sericulture, i.e., eri-culture was prevalent about three decades back.

Table 10.1

Cumulative percentage of mulberry area and number of sericulturists in Darjeeling District

Year	Area under mulberry (ha.)	P. C. of mulberry to total mulberry area	Cumulative p. c. of mulberry	Number of adopters	P. C. of adopters to total	Cumulative P. C. of adopters
1974-75	30.07	1.52	1.52	60	6.09	6.09
1975-76	168.31	8.30	9.82	64	6.50	12.59
1976-77	240.47	12.15	21.97	74	7.51	20.10
1977-78	352.19	17.79	39.76	118	11.98	32.08
1978-79	419.00	21.17	60.93	180	18.27	50.53
1979-80	357.76	18.07	79.00	224	22.74	73.09
1980-81	411.85	20.84	99.84	265	26.90	99.99

(Source : Computed from the Records of Directorate of Sericulture and Silk-weaving, Kalimpong and Calcutta).

Table 10.2

Cumulative percentage of mulberry area and number of sericulturists in Jalpaiguri District

Year	Area under mulberry (ha.)	P. C. of mulberry to total mulberry area	Cumulative p. c. of mulberry	Number of adopters	P. C. of adopters to total	Cumulative P. C. of adopters
1975-76	14.56	3.34	3.34	—	—	—
1976-77	12.81	2.94	6.28	1	0.25	0.25

Table 10.2 (Contd.)

Year	Area under mulberry (ha.)	P. C. of mulberry to total mulberry area	Cumulative p. c. of mulberry	Number of adopters	P. C. of adopters to total	Cumulative P. C. of adopters
1977-78	44.88	10.31	16.59	114	28.93	29.18
1978-79	49.53	11.38	27.97	120	30.45	59.63
1979-80	49.53	11.38	39.35	75	19.03	78.66
1980-81	114.72	26.36	65.71	84	21.31	99.97
1981-82	149.11	34.26	99.97	—	—	—

(Source : As in previous Table)

Table 10.3

Cumulative percentage of mulberry area in West Dinajpur District

Year	Area under mulberry (ha.)	P.C. of mulberry to total area under mulberry	Cumulative P. C. of mulberry
1976	11.48	0.71	0.71
1977	24.00	1.48	2.19
1978	73.80	4.58	7.48
1979	320.00	19.76	30.14
1980	410.00	25.32	65.84
1981	780.00	48.17	154.53

(Source : Central Silk Board, Calcutta, 1981)

Because of uneconomic return and other socio-cultural constraints, eri-culture has been gradually neglected. It had become an unimportant occupation till 1979. It was during this year, the Lutheran World Service (LWS) took special interest for its revival amongst the tribals as well as non-tribal people of Jalpaiguri district. With this aim in view, both sericulture and eri-culture experimental farms have been set up by LWS at Sariam, Madarihat and Kumargram. Persistent efforts have led to growing consciousness amongst the villagers of the utility and viability of such culture in the region, the dissemination process is thereby initiated (Vide Fig. 32 & 33). It becomes apparent from the field study at Madarihat and Alipurduar that the people have realised the utility of this culture as an additional source of income and therefore are willing to take up sericulture as well as eri-culture in the area. The pioneer sericulture village of Bashirdanga in Maynaguri Police Station of Jalpaiguri District is an example. About 30 villagers have accepted sericulture in this village. The size of land-holding is about 0.13 ha. and the average annual yield of mulberry

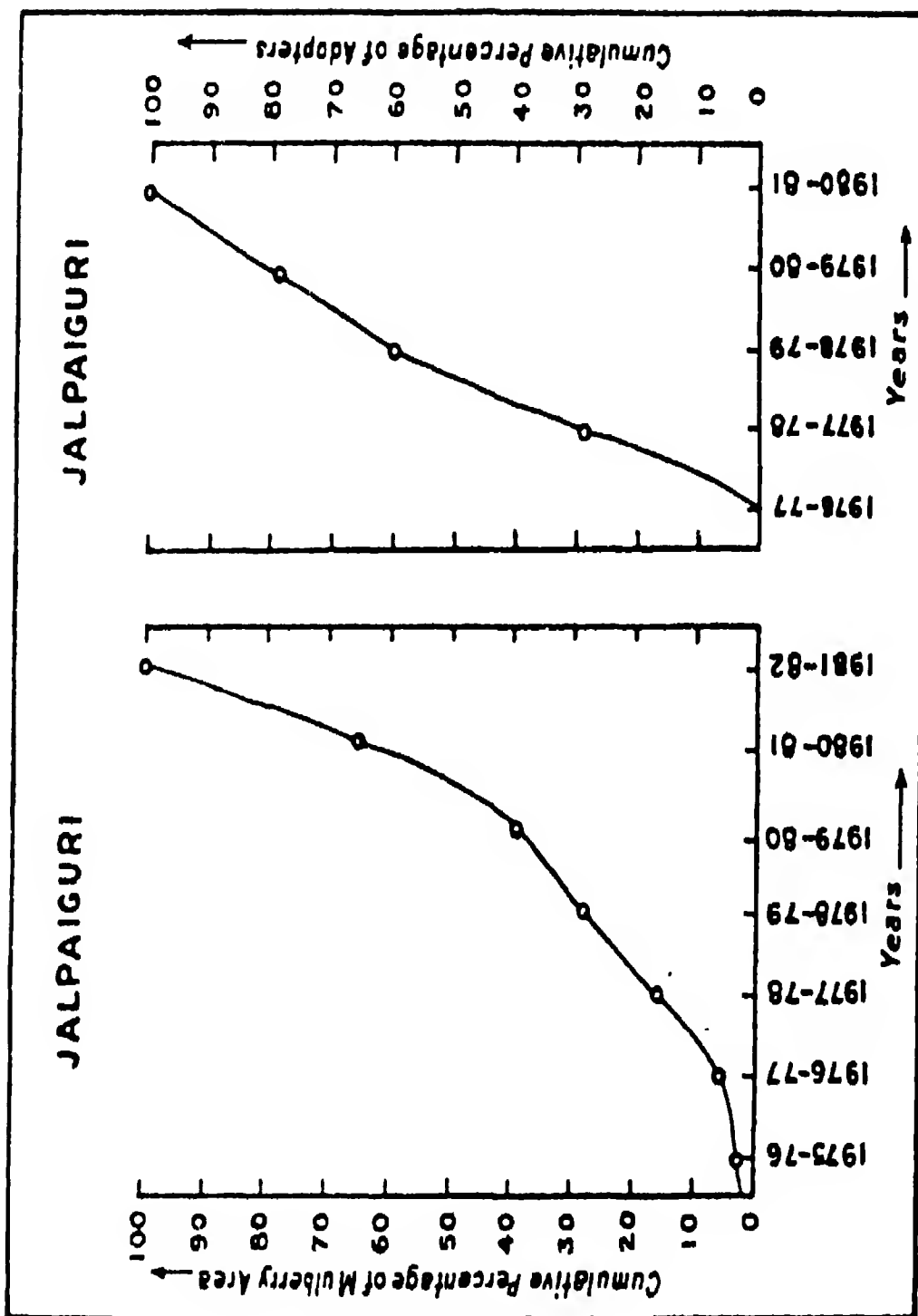


Fig. 32+33.

mulberry leaves is 670 Kg. from the same.

At Sariam, there are approximately 123 sericulturists. The entire infra-structural set up is provided by the LWS. Mulberry cultivation is usually carried on fallow lands otherwise not particularly suitable for traditional agriculture. This region has achieved an integrated approach in silk production. This experimental station has been designed to diffuse the knowledge of sericulture in an integrated way in the surrounding region.

In the field of eri-culture, the role of Madarihat centre is quite significant. At Chokamari village near Madarihat, a number of tribals, approximately 30 in number have taken up eri-culture and weaving as their subsidiary occupation. Birpara village in Alipurduar Police Station acts as a micro growth centre where extensive tribal areas have been brought under eri-culture. In these regions, eri-culture is practised purely on cottage basis. The tribal women are mainly engaged in this activity. The region located in between Madarihat and Kumargram was formerly noted for eri-culture, though the fabrics were produced for domestic consumption only. At present, there are approximately 1,000 eri-rearers in this region which has been possible due to the assistance of various co-operative organisations. The marketing of fabrics has now been somewhat regulated. In Coochbehar district, development is relatively poor. Sericulture is being encouraged here. The State Government has taken up expansion programmes in the following police stations since 1975.

Table 10.4

Expansion Programmes of Sericulture at Specific Centres in North Bengal

Name of the P.S.	Name of the Village
1. Tufanganj	1. Matalhat 2. Ambari 3. Volka 4. Jitpur 5. Choudhurihat
2. Mathabhanga	1. Banarhat
3. Coochbehar	1. Pondibari
4. Haldibari	1. Putimari

(Source :Directorate of Sericulture and Silk-weaving, Siliguri, 1981).

At present, Coochbehar district claims only 26 hectares of land under mulberry. There are only 95 sericulturists in the district. The production of cocoon is 3,200 Kg. per annum. Under LWS, a new programme of sericulture has been taken up in Coochbehar near Jamaldah on 2 hectares of land which will benefit about 15 families.

Table 10.5

Comparative advantages and disadvantages of Government and Non-Government units in Jalpaiguri, Darjeeling, Coochbehar and West Dinajpur Districts, 1982 (Sericulture and Eri-culture).

Name of the Centres	Ecological factors for mulberry/castor plantation and rearing of mulberry and eri cocoons				Economic factors for reeling and weaving of silk fabrics	
	Tem. in °C, Rainfall in mm., Relative Humidity in P. C.			Transport linkage	Supply of labour	Distance from origin/market
	Terrain	Soils	Climate			
Sariam Sericulture (LWS)	Flat	Sandy loam	T17-28 R 3353 H 74	N. F. R. and Metalled road	Unskilled	Malda (268) Km.
Ambari-Falakata Sericulture (Govt.)	Flat	Sandy loam	T16-28 R 3131 H 73.5	N. F. R. and Metalled road	Unskilled	Malda (236)
Matigara Sericulture (Govt.)	Flat	Sandy loam	T16-28 R 3131 H 73.5	N. F. R. and Metalled road	Unskilled	Malda (23)
Puṁmari Sericulture (LWS)	Flat	—	T17-29 R 3842 H 70	N. F. R. and Metalled road	Unskilled	Malda (316)

Note : T : Temperature; R : Rainfall; H : Humidity.

In West Dinajpur district, the State Government has taken up particular initiative in this respect. The objective is to rehabilitate the refugee families and for this purpose several colonies have been set up. In these colonies, some areas are used in mulberry cultivation. Silkworm rearing process was first introduced here by the personnel of LWS. The Handloom Weaving Centre at Surangapur Colony employs 18 people who work on 6 looms. The Weavers' Committee administers the weaving centre. The district has recently revitalised eri-culture. About a hectare of land has been brought under castor plantation in Danirhat and Naudajhar colonies in Chopra and Goalpokhar police stations where about 5 families have adopted eri-culture. At Bamanbari Housing Colony about 1.4 ha. of land are being brought under castor farming, wherein about 46 families have been brought under this vocation.

A careful analysis of the various centres reveals some interesting features (Vide Table 10.5). The centres located near Malda have imbibed the technology in a relatively shorter period than those located at a distance. The former categories enjoy better locational advantage, irrespective of other factors because the major market of silk lies in Malda. In case of eri-culture on the other hand, market being local, catering to the needs of the surrounding villages, the centres do not face the distance-decay constraint. Certain of additional eri-centres in the interior regions of Madarihat, Kumargram and Alipurduar, will undoubtedly help in widespread diffusion of technology among the people. The tribal and non-tribal population need technological and entrepreneurial assistance to revive eri-culture which is presently practised on a subsistence level. Later on, marketing facilities on a commercial scale may be necessary to sustain the present trend of growth rate.

Sericulture in non-traditional regions, however, involves wider marketing sphere. As mulberry is a high valued cash crop and subsequent rearing and reeling require specialised skill and machinery, its widespread acceptance amongst the people will depend on organised development of market. So far the trend of these regions is towards an integration, which has evoked response from the local people. But market assurance is vital, which is impeding further diffusion of the new technology. It may be mentioned in this context that of the various centres of North Bengal, successful innovation is quite apparent at Sariam.

Pattern of Diffusion in Western Region

In Birbhum district, sericulture has been introduced in Bolpur, Ilambazar, Nanoor, Labpur and Dubrajpur police stations. The diffusion

process in this district is still at its early stage (Vide Figs. 34 & 35). The saturation point is yet to be reached. The exogenic forces are more active in these regions than other considerations. The government is providing widespread irrigation facilities to mulberry farms as water is the chief constraint of this region.

In Birbhum district, the diffusion process has been accelerated due to infra-structural facilities provided by the government in the form of better irrigation facilities and implementation of bank finance scheme. In this particular region the problem of cocoon marketing is acute. The adopters have to face total financial loss in case

Table 10.6

Spatial distribution pattern of mulberry farming and silkworm rearing in non-traditional areas of Birbhum, 1980

Name of P.S.	Number of villages	Area under mulberry	Number of rearers	Production of cocoon (kg.)
Bolpur	24	80	40	5,500
Illambazar	7	23	12	660
Nanoor	8	6	6	330
Labhpur	5	12	10	—
Dubrajpur	5	6	1	—

(Source : Directorate of Sericulture and Silk-Weaving, Bolpur).

Table 10.7

Cumulative percentage of mulberry area and number of sericulturists in Birbhum District

Year	Area under mulberry (ha.)	P.C. of mulberry to total mulberry area	Cumulative p.c. of mulberry	Number of adopters	P.C. of adopters to total	Cumulative p. c. of adopters
1950-51	243	12.72	12.72	1282	15.54	15.54
1960-61	215	11.26	23.98	1350	16.36	31.90
1970-71	376	19.70	43.68	1649	19.99	51.89
1979-80	1075	56.31	99.99	3970	48.12	100.01

(Source : Directorate of Sericulture and Silk-Weaving, Suri, 1980).
of crop failure. Unless this constraint is removed, the spread effect is likely to be retarded. The logistic curve of the Birbhum district (Vide

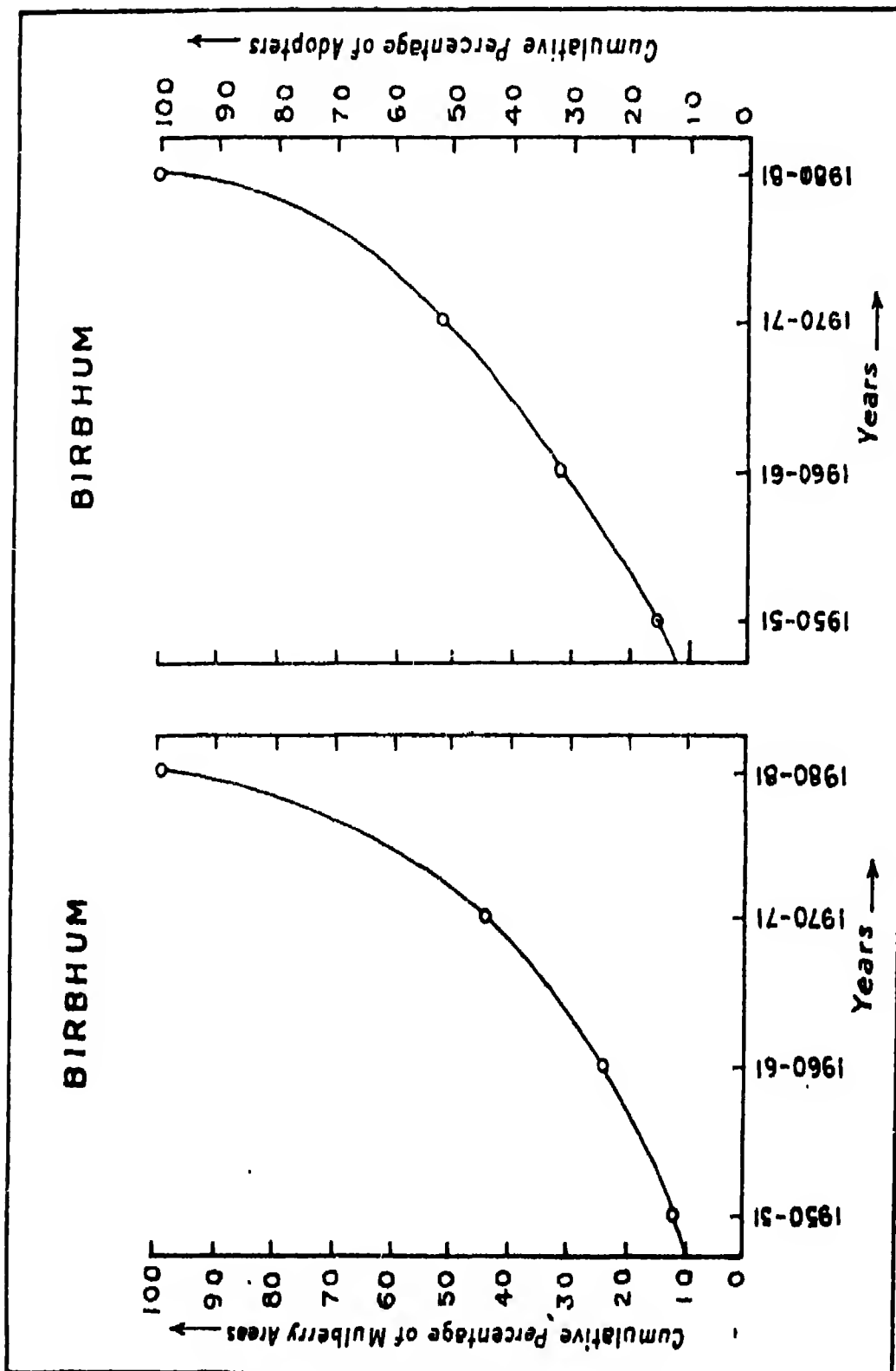


Fig. 34+35.

Fig. 34 & 35) indicated a stage of early diffusion process. The curve is still rising. The saturation point is yet to be reached.

Bankura District : Bankura district is under Drought Prone Area Programme (D.P.A.P) of the Government. Mulberry cultivation is encouraged as a part of this programme. Ecological congeniality of the region is ideal for rearing of the bi-voltine cocoons in winter months, provided the supply of mulberry leaves is sufficient.

The areas selected for mulberry cultivation under D.P.A.P are Indpur, Ranibandh, Gangajalgjhati, Chatna, Saltora Mejia and Khatra. Besides, necessary financial and technological inputs are being provided to the people. A Demonstration Farm has been set up at Chatra. Moreover, the State Government is taking particular interest to initiate the tribals of Taldangra in tasar culture. Compared to other areas, the transfer of technology at Onda region appears to be poor. Additional pilot centres with compact sectoral activities are, therefore, necessary. The awakening process is yet to be initiated in the region. Unless the villagers are convinced of the profitability of sericulture, they will be reluctant to adopt it as a subsidiary occupation.

In Purulia district, the degree of diffusion appears to be negligible. As the region possesses immense viability in the field of tasar culture, additional incentives in this direction are likely to bring more dividends. As per the recommendation of the National Commission of Agriculture there is a proposal to bring about 80 ha. of land under mulberry cultivation in Purulia district as a part of D.P.A.P.

Role of Institutional Finance in Diffusion : The development of sericulture in West Bengal since 1974 is largely due to the credit facilities given by banks and other financial institutions. The Planning Commission also provides institutional finance for sericulture development in the State. These credit facilities have undoubtedly helped in the diffusion process.

During 1975-76 an integrated bank finance scheme was introduced and the leading nationalised banks were brought under its wing. These banks examined the viability of sericulture in the State and sanctioned loans primarily through co-operative societies and in a smaller scale, directly to the entrepreneurs. An amount of 50% of the total cost is provided for mulberry farming, construction of rearing houses, digging tube-wells, construction of drainage etc.

Furthermore, the necessity of construction of reeling units has been recognised by the bank authorities. The possibility of integrating rearing, reeling and weaving sectors of sericulture has been considered carefully by

the Agriculture Refinance Development Corporation (ARDC).

It is evident that maximum credit facilities from the banks are made available to the sericulturists in Murshidabad district, being followed by Malda, Birbhum and Nadia (Vide Table 10.8). These investments have resulted in a significant increase in the areas under mulberry. Prior to this financial aid programme, the area under mulberry was 5,535 ha. in 1973-74. The figure was increased to 7,234 ha. in 1975-76. It now stands around 9,500 ha. Several nurseries, rearing centres for early stages of silkworms, government grainages, composite units etc. have come up.

Table 10.8

Financial aid by various banks in sericulture in different districts of West Bengal (1975-76)

Name of the district	Name of the Bank	No. of cases sanctioned	No. of co-operative societies financed	Amount of bank loan (Rs.)
Malda	United Bank of India	443	7	944,301
	State Bank of India	81	—	174,099
	Gour Gramin Bank	149	—	334,780
	District Central Co-operative Bank	77	4	219,665
Murshidabad	United Bank of India	553	6	1,708,738
	State Bank of India	95	—	182,214
Birbhum	United Bank of India	57	1	186,708
	State Bank of India	13	—	24,986
	Allahabad Bank	23	—	46,816
	United Commercial Bank	4	—	4,440
Nadia	United Bank of India	17	—	91,486
West Dinajpur	State Bank of India	2	—	2,375
Jalpaiguri	Central Bank of India	1	—	10,032
Burdwan	United Bank of India	1	—	12,555
Total		1516	18	3,943,195

(Source : Computed from the Records of Directorate of Sericulture and Silk-Weaving, Govt. of W. Bengal)

The banks prefer to provide necessary finance to silk co-operative societies rather than private individual (Vide Table 10.9). This policy gives

emphasis on co-ordination amongst the various sectors of this occupation. But this policy has been relaxed to some extent because of the local entrepreneur's unwillingness to join with a co-operative. Most of them preferred to operate individually on a cottage basis fearing greater risk in co-operative operation. It is necessary to handle this problem from a sociological point of view. That the co-operative operation is economically viable can only be disseminated amongst the sericulturists of both the traditional and non-traditional areas, through education, extension service and technology transfer. This may take time but some indications are evident in this direction.

From the Table 10.9 it is evident that Malda records the maximum number of primary co-operative societies and therefore bank credit facilities are liberal. Murshidabad shows viability for further investment and maximum amount of bank loan is being granted there. More and more entrepreneurs are gradually interested in sericulture in Murshidabad. A comparative analysis of investment in Malda and Murshidabad zones is given below (Table 10.10).

Table 10.9

Credit facilities accorded to Primary Co-operative Societies (in Sericulture) in West Bengal, 1975-76

Name of the district	Name of the primary co-operative society	Location	Adopted by	No. of cases-sanctioned	Project cost	Subsidy 25%	Bank loan 50%	Entrepreneurs contribution 25%
Malda	Kashchandapur S. K. U. S.*	Kaliachak	U. B. I.	46	188,012	47,003	94,006	47,003
	Chandapur S. K. U. S.	-do-	-do-	29	122,808	28,202	56,404	28,202
	Jalalpur S. K. U. S.	-do-	-do-	20	110,944	27,736	55,472	27,736
	Salimpur, S. K. U. S.	-do-	-do-	85	374,028	93,507	137,014	93,507
	Gayeshbari S. K. U. S.	-do-	-do-	35	106,672	26,668	53,336	26,668
	Sultanganj S. K. U. S.	-do-	-do-	49	418,156	104,539	209,078	104,539
	Trimohini Raipur S. K. U. S.	Kaliachak Block II	-do-	7	20,740	5,815	10,370	5,815
	Amtala Jagatguru S. K. U. S.	Kaliachak Block II	D. T. Central Co-operative Banks	46	264,350	66,086	132,379	66,086

* Samabay Krishi Unnayan Samity.

Table 10.9 (Contd.)

Name of the district	Name of the primary co-operative society	Location	Adopted by	No. of cases-sanctioned	Project cost	Subsidy 25%	Bank loan 50%	Entrepreneur's contribution 25%
Murshidabad	Chotomahadipur S. K. U. S.	-do-	-do-	29	160,210	40,052	80,586	39,572
	Ekbarabad Khanpur S. K. U. S.	-do-	-do-	1	5,309	1,327	2,700	1,282
	Uttar Laximpur S. K. U. S.	-do-	-do-	1	8,000	2,000	4,000	2,000
	Sangarpur Union Silk-work Rearing and Seed Growers Co-opt. Society Ltd.	Sangarpur	U. B. I.	260	2,089,360	530,532	1,085,361	473,467
	Debipur Anchal Silk-worm rearers and seed growers Co-opt. Society Ltd.	Debipur	U. B. I.	82	454,486	112,074	230,338	112,074
	Joy Krishnapur Resham Kit Pos Samabaya Samity Ltd.	Mukundapur	-do-	67	274,231	71,232	146,999	56,000
	Dahapara Anchal Resham Kit Pos Samabaya Samity Ltd.	Dahapara	-do-	23	120,659	29,958	60,743	29,958
	Bankipur Chandraghat Samabaya Resham Silpa Unnayan Samity Ltd.	Rasulpur	U. B. I.	12	44,579	11,102	22,375	11,102
	Derul Bakhraabad Resham Unnayan Samabaya Samity Ltd.	Rasulpur	U. B. I.	15	58,131	14,533	29,065	14,533
Birbhum	Dwarka Beshi Samabaya Samity Ltd.	Rampurhat Block, Bishnapur	-do-	57	352,930	85,970	168,708	80,252

(Source : Directorate of Sericulture and Silk Weaving).

Table 10.10

Amount of investment in various sectors in sericulture (1975-76)

Items	Malda	Murshidabad	Total
New Plantation	17,465	596,980	614,445
Irrigation	28,000	79,088	107,088
Rearing House and Implements	3646,697	3,814,097	7,460,794
Construction of Grainage	—	185,000	185,000
Total	3,692,162	4,675,165	8,367,327

(Source : Directorate of Sericulture and Silk-Weaving, Govt. of West Bengal).

These financial institutions have to face an immense task to achieve break-through in the entire investment pattern in rural areas. The present situation is rather grim. Due to the existence of dual sectors of credit facilities- private public, the investment pattern and trade mechanism have become highly complex, particularly in rural areas. Because of the practice of usury and operation of middlemen, the village entrepreneurs are completely at the mercy of these private financiers. This age old practice has its stronghold in most of the sericulture villages of West Bengal. Therefore the task of these financial institutions should be to free the village entrepreneurs from this kind of bondage by creating a sense of financial security amongst them on the one hand, encouraging the traditional farmers to take up sericulture as a subsidiary occupation at the other. When the profitability of the latter is fully established, the traditional farmers will accept it as a full time occupation. This kind of approach might be helpful in the process of diffusion.

Outlook

Several theories have been propounded on innovation diffusion and its adoption. The theories applied in various sectors of production for different regions, depict differential pictures, both in the pattern and process of diffusion. The determinant factor in the process is the level of development of the region concerned.

In the context of diffusion several factors play distinctive roles in sericulture in West Bengal. The following appears to be important amongst them:-

- i) As the study area is large, the adoption process of sericulture still remains extensive rather than intensive.
- ii) The average period for diffusion takes about 6-7 years, and

is still in operation in some areas.

- iii) In most cases, the diffusion process is the outcome of external forces. But its implementation depends largely on the success of extension programmes, pilot projects, institutional finance and infra-structural facilities. In most cases, the diffusion is at the 'awareness stage', where the potential adopters are gradually learning the details of this innovation. However, there still exists information gap. As such, the adopters are not fully convinced about it.
- iv) At certain places like Darjeeling or Southern part of Birbhum district, adoption stage is reached in the diffusion process, where the adopters have accepted and are making full use of innovation.
- v) Certain degrees of rejection have also become apparent at some places (like Birbhum district), where the people are reluctant to adopt high-yielding mulberry strain and silkworm due to the risk element associated with them. As mulberry is a high valued cash crop, and is linked up with the functioning of the subsequent production mechanism (viz. rearing, reeling and weaving), price fluctuation is a common factor. This is another reason for a mounting resistance within the early adopters.
- vi) The spatial pattern of diffusion of human behaviour is closely linked with distance and time scale. Here-in lies the tremendous contribution of the modern transport/communication system. In West Bengal this is the chief constraint. It is revealed that diffusion practice in the north is closely linked up with the lines of communication. As a result, the remote areas have not become particularly successful in the transfer of technology.
- vii) In the absence of proper mass-media, the villagers of distant areas depend entirely on migrant labour from Malda in imbibing new ideas and techniques.

It is expected that the diffusion process will gain momentum in the coming years because of the expected economic development, growth of communication and efficient transport net, expansion of education and mass media system of the country.

CHAPTER XI

CONCLUSION

Bio-Ecological Factors

It is apparent that the major silk producing regions of West Bengal face the bio-ecological constraints for mulberry cultivation and silkworm rearing. The absolute ecological range existing in the said regions restricts the prospect of rearing the high-yielding bi-voltine cocoon. Therefore, a diffusion process is initiated which takes into account the possibilities of introducing sericulture in non-traditional regions, having ideal bio-ecological environment for sericulture but may be deficient in socio-cultural and economic environment for production and marketing of silk fabrics. With this end in view, the government and non-government agencies, are taking measures to make these new areas economically viable for silk production. This new process of decentralisation is showing signs of bright future.

Spatial Integration

The disaggregated production sectors of sericulture, at present impose limitations on efficient functioning of the industry in West Bengal. Therefore, a structural as well as spatial integration of various sectors has been designed in the prospective new areas. In some sections, the programme has been actually initiated. The experiments carried out so far have given positive results. This practice of integrated production is likely to be applied in the field of commercial production in future.

Growth Constraints and their Remedies

There are several growth constraints in fostering sericulture in West Bengal.

Mulberry Farming : In the first instance, mulberry cultivation is carried in restricted pockets. An areal expansion of mulberry lands is not likely to succeed because of high man/land ratio, thereby making it difficult to transfer croplands to mulberry culture. As such mulberry is so far largely confined in non-crop land. It is usually cultivated in fallow lands. Further, expansion of mulberry cultivation in marginal waste lands would entail large-scale capital investment in landscaping and adequate treatment of soils and water supply. Therefore intensification of cultivation is indispensable for achieving high yield rate. In order to attain this objective several measures need to be adopted. There is need for irrigation water. At present only 10% of the mulberry fields are getting irrigation facilities. The soils also need fertiliser treatment so as to introduce improved

techniques of cultivation. The hybrid mulberry seeds respond to irrigation and fertiliser treatment.

Silk-Worm Rearing : Application of scientific methods in silkworm rearing is almost a pressing need at present. This technique prefers controlled humidity and temperature conditions to get better yield in the rearing centres. The rearers are likely to benefit if they are provided with a greater quantity of disease-free layings. Eradication of the fly-pest menace is an absolute necessity. Construction of separate rearing houses in traditional areas may also prove beneficial. Other measures include adoption of hybrid varieties of silkworm races to fit in with the respective ecological conditions, provision of grainage units etc.

Silk Reeling : Success of sericulture also depends on improved and scientific methods of reeling. Construction of big filatures at the moment might not be a practical proposition due to frequent scarcity of raw-materials. Unless the production of bi-voltine cocoon is substantially increased, the problem of cocoon supply to the filatures is likely to persist. The setting up of small units with improved machines in cocoon producing regions is, therefore, advisable because superior yarns are available from the scientific methods of reeling. At present, supply of quality yarn at a reasonable cost is the chief production constraint both in mulberry and non- mulberry sectors.

Silk-Weaving : The production of quality silk fabrics in the State depends largely on the performance of the powerloom sector. This should be developed simultaneously with the handloom sector. The powerloom sector in sericulture is not so common in West Bengal. It may, however, be pointed out that the powerloom as well as the handloom sector should not create any dichotomy so far as the production of silk fabrics is taken into account. The powerloom sector should exclusively be entrusted to the production of quality fabrics, production of which still falls short of the requirements. The huge quantity of mulberry silk waste and non-mulberry yarn can be effectively utilised in the handlooms. The entire yarn production, from both tasar and eri sector, is not particularly suitable for powerloom weaving, at its present stage of processing. West Bengal has still to go a long way in achieving production efficiency in the non-mulberry sector. Therefore, at the moment, powerloom production can be proposed only for the mulberry sector.

Market Mechanism : The process of the market mechanism is extremely complicated under the present stage of economic production. Markets in rural areas are just emerging from a subsistence-domestic-consumption

stage to commercial-competitive-consumption stage. The markets of silk fabrics, however, are located largely in overseas countries. As such, the market mechanism of finished silk fabrics is closely linked up with elasticity of world demand and supply. The export oriented growth of sericulture sector in the past few decades has shown that price fluctuation in international commodities has adversely affected the domestic sector as well. In this process, the primary producers are also adversely affected because of exploitation at both ends, e.g., at the production and marketing stages by the intermediaries. The middlemen practically control the market of the handloom sector, as the major part of the processing is done in rural areas where productivity of labour is low and capital investment is negligible. In such a situation, the scope for institutional finance is limited to the primary producers. Marketing of the finished product is still more difficult due to the absence of organised markets. The only alternative is to depend on the merchant-capitalists. This monopsonistic-monopolistic system of factor market and product market naturally acts as a detrimental factor in silk production.

Main Features : The silk industry in West Bengal is controlled and operated by private entrepreneurs. The government is only rendering services to ensure supply of raw-materials to the commercial cocoon producers in two ways, viz., i) supplying seed cocoons through nurseries, and ii) supplying disease-free layings through the government grainages. The Government has the credit of supplying 10% of the total requirement of the rearers. There is also a third form of institution, viz., "Selected rearer and aided grainage" which contributes approximately 15-20% of the total raw-material supply. It is, therefore, evident that bulk of the raw material supply (about 70% of the total) comes from private sources. The private entrepreneurs prefer to operate in a monopolistic way. It may also be noted that about 85% of the total business of silk yarn in the state is transacted privately through the 'master reelers'. There is no price fixation in case of yarn. But in case of cocoon, the 'kakeme' system is prevalent (Ref. Ch. VI). It is a prevalent practice of the master-reeler/weaver to act as dealers and carry on trade in silk fabrics. The Khadi Commission claims to have control on about 45% of the market produce. The commission, however, prefers to deal with institutions like co-operative societies or other registered units. Thus over 55% of the trade is carried in an unorganised fashion. The Central Silk Board is rendering assistance only up to the reeling stage. The bulk of the export is also conducted by private exporters. The Central Silk Board only helps in channelising the export deals.

Economics of Production

In many cases, sericulture is practised as a part time occupation of the people in rural areas of West Bengal. Even in case of the sericulturists who are engaged in rearing, reeling and weaving operations are engaged in such

occupation for not more than 7 to 8 months in a year. At other times they are naturally engaged in agricultural activities. Therefore, most of the cultivator/rearers own some lands meant for cereal or food-crop production. Thus, sericulture provides an additional source of income. Moreover, at each stage of processing the risk factor for a marginal cultivator/rearer becomes increasingly higher in the prospect of his meagre income. Therefore, there is a tendency to dispose off the semi-processed goods in order to have a quick cash return from this occupation. It may be further noted, that the cultivator/rearers generally possess more land than reeler/weavers, who form a part of the rural proletariat. In most cases the reeler/weaver class are landless people though there are few exceptions. There are a number of wealthy weavers holding large plots of land in Birbhum (Vide Ch. IX). Therefore to make sericulture a viable and profitable occupation, it is necessary to assure greater financial security to the reeler/weavers than the cultivator/rearers. The registered co-operative societies have a major role in achieving this objective. The co-operatives can efficiently help in the task of co-ordinating the work of reelers and weavers on a common forum. But production efficiency requires a well formulated policy of co-ordination between the production units on the one hand and marketing trade and consumers' preference on the other. The non-mulberry sector is presently producing silk fabrics only for domestic markets. The economic return from this sector is less as compared to mulberry sector with clientele in overseas market. The primary producers, therefore, have to depend on the agricultural sector for the sustenance of their economy. As such the non-mulberry sector needs careful planning and resource allocation so as to enable this sector to make full use of its potentialities.

Diffusion Process

Recent development of sericulture in West Bengal in mulberry and non-mulberry sectors is due to combined incentives of the Government and intensive works of some co-operative institutions and a few voluntary organisations. Unless the process becomes endogenic the sustenance of such phenomenon will remain short-lived. To persuade the rural people in this occupation may take time. This requires inter-action between the pioneers in the field with the recent innovators and new adopters. Diffusion process may be easier through improved transport and communication system, use of mass media and also elaborate technology transfer through well formulated extension programmes.

Outlook

The future outlook of sericulture in West Bengal depends on concomitant growth and development of the various regions of the State. Each region should be made self-supporting in terms of raw-material supply

and its subsequent reeling and processing of manufactured goods. Sericulture in West Bengal still remains restricted within the informal sector of economy, being characterised by reliance on indigenous resources, family ownership of enterprise, small-scale operation, labour-intensive and adopted technology, skills acquired outside the formal school system, and unregulated and non-competitive markets. The entire system should be gradually brought under the purview of formal sector, with emphasis on co-operative ownership, large-scale operation, capital intensive and imported technology, formally acquired skills, reliance on overseas markets in the supply of quality yarns, protected markets through tariffs and trade licenses. Mere scientific and technical inventions in the field of mulberry culture and silkworm rearing will not solve the problem. The deep-rooted socio-cultural as well as economic fabrics of the rural society have to be studied and moulded in this context.

Analysis carried in the three production sectors, viz., rearing, reeling and weaving in the major and minor regions of the State reveals some interesting patterns of development of sericulture in the State.

Table 11.1a

Correlation coefficient between number of rearers and production of cocoons, Malda

Name of the P.S./BL	X	Y
	Cocoon Rearer's family	Production of cocoons (Kg.)
Kaliachak I	21,028	2,967,200
-do- II	5,624	797,400
-do- III	1,579	185,760
English Bazar	2,408	212,200
Manickchak	145	32,400
Ratua I	35	4,680
-do- II	61	7,200
Gajole	20	3,600
Harishchandrapur	3	3,700
Habibpur	71	10,800
Old Malda	145	16,200
Kharba I	8	1,800
-do- II	23	2,502

+ 0.99.

Table 11.1b
Murshidabad

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Kg.)
Nabagram	1,930	274,779
Jalangi	1,356	45,526
Raghunathganj I	4	457
-do- II	44	6,192
Raninagar II	260	2,842
Sagardighi	11	2,340
Bharatpur	30	2,242
Beldanga I and II	1,263	81,502
Kandi	35	2,456
Burwan	60	9,982
Jiaganj	37	8,010
Khargram	1,774	301,500
Berhampur	68	4,873

$$r = +0.88$$

Table 11.1c
Bankura

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Kg.)
Taldangra	143	2,318
Raipur	14	152
Onda	10	115
Simlapal	28	371
Bishnupur	123	6,126

$$r = +0.78$$

Table 11.1d
Birbhum

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Kg.)
Rampurhat I	12	2,352
-do- II	690	108,242

Table 11.1d (Contd.)

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Kg.)
Nalhati I	1,363	269,997
-do- II	1,102	189,581
Muraroi I	9	1,120
-do- II	27	2,740
Mayureswar I	131	29,259
-do- II	32	8,305
Mahammad Bazar	11	2,314
Suri I	1	932
Labhpur	49	7,350
Sainthia II	1	230

$$r = +0.99$$

Table 11.1e
Midnapore

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons mulberry & tasar (kg.)
Sabong	34	235
Pingla	158	1,390
Moyna	11	0.25
Debra	1	240
Nayagram	49	525
Gopiballavpur	117	1,057

$$r = +0.97$$

Table 11.1f
Darjeeling

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Number)
Kalimpong I	92	262,284
-do- II	51	106,115
Bijanbari	204	446,242

$$r = +0.97$$

Table 11.1g

Nadia

Name of the P.S./BL	X	Y
	No. of Rearers	Production of cocoons (Kg.)
Ranaghat I	13	3,185
-do- II	19	5,008
Krishnanagar	1	120

$$r = +0.99$$

Table 11.1h

Purulia

Name of the P.S./BL	No. Rearers	Production of cocoons (tasar) (Kg.)
Hura	960	360
Puncha	590	221
Purulia	95	36

$$r = +0.99$$

Table 11.2

Correlation coefficient between the number of basins and production of silk yarn

Murshidabad :

Name of the P.S./BL	X No. Rearers	Y Production of silk yarn (Kg.)
Beldanga I	33	2,500
-do- II	2	170
Khargram	130	8,750
Nabagram	320	23,250
Raghunathganj II	309	21,000
$r = +0.99$		
Birbhum :		
Nalhati I	53	5,355
-do- II	12	1,440
Muraroi II	120	9,127
Rampurhat II	72	7,607
$r = +0.96$		

Table 11.3
Correlation co-efficient between the number of looms and production of silk fabric

Murshidabad :

Name of the P.S./BL	X No. of Looms	Y Production of silk fabric (m.)
Nabagram	17	8,500
Khargram	2,516	1,258,000
Burwan	267	128,500
Kandi	67	29,500
Bharatpur	168	81,500
Raghunathganj I	289	139,500
-do- II	268	129,000
Raninagar I	1,019	505,500
Berhampore	89	44,500
Jiaganj	249	122,00
Hariharpara	138	66,500
	$r = +0.99$	
Birbhum :		
Nalhati I	393	249,188
-do- II	219	237,308
Rampurhat I	4	2,420
-do- II	1,612	1,166,892
Mayureswar I	131	119,162
-do- II	20	15,495
Khoyrasole	7	3,240
Muraroi I	125	59,540
-do- II	99	38,760
Mohammad Bazar	9	3,080
Rajnagar	304	110,806
Dubrajpur	105	43,512
Suri	115	53,634
	$r = +0.99$	
Bankura :		
Bishnupur	177	54,726
Jaypur	121	36,986
Sonamukhi	184	89,464
Patrasayer	154	173,299

$$r = +0.18$$

(Source : Directorate of Sericulture and Silk-Weaving, Govt. of West Bengal).

Table 11.4

Correlation co-efficient values in rearing, reeling and weaving sectors of sericulture in West Bengal, 1981

Regions of sericulture (Major and minor)	Rearers and production of cocoons	Reelers and production of yarn	Weavers and production of fabric
Malda	0.99	N.A.	Nil
Murshidabad	0.88	0.99	0.99
Bankura	0.78	N.A.	0.18
Birbhum	0.99	0.96	0.99
Midnapore	0.97	N.A.	N.A.
Darjeeling	0.97	Nil	Nil
Nadia	0.99	Nil	Nil
Purulia	0.99	Nil	Nil

(Source : Computed from Table 11.1, 11.2 and 11.3)

The above table has been prepared with a view to analysing the production efficiency in different sectors of production in sericulture in different regions. The second test has not been applied to Malda, because of the lack of estimated data on number of reeling basins and production of silk yarn. However, Malda has the maximum number of reeling basins in the State, the majority of which is owned by private enterprises. The maximum yarn production of the State comes from Malda. Therefore, it can be assumed that the production efficiency in this sector is the highest, although this fact is difficult to establish in quantitative norms. The analysis reveals that Birbhum district appears to be the most viable region for development, followed by Murshidabad, Malda and Midnapore. In Malda there is scarcely any weaving unit. As such this region ranks lower than either Birbhum or Murshidabad from the point of view of integrated development. On the other hand, the former region may perform the function of a traditional raw-material base.

Besides production efficiency, there are other factors like regional specialisation in the analysis of sectoral activities. Such specialisation is vital to the growth of informal economy. A model development may, therefore, be suggested in which the most viable sectors of sericulture, viz., reeling and weaving in suitable regions, may be further supplemented by the sophisticated sector of production, viz., printing and dyeing, wherever the economy of scale permits.

In the last few decades West Bengal has achieved a significance in the field of integrated production. This achievement is particularly discernible in the non-traditional regions which are found to be more viable from the point of view of development than the traditional centres. The traditional regions have attained more or less a saturation stage, where introduction of new technology is difficult because of the existence of age-old traditional market mechanism. The effective measures in removing the conflict between the primary producers on the one hand and the monopsonistic operation in the factor market on the other and again between the consumers and monopolistic operation in the product market appear to be more fruitful in ecologically viable non-traditional areas. This is due to the feasibility of creating a new set of infra-structural facilities in the new areas. These new areas have not attained a commercial scale of silk production, but may prove to be so in near future. A closer co-operation between voluntary organisations and government machinery may be helpful in attaining this objective. The voluntary organisations are better equipped in disseminating the improved technology to new areas because of their closer contact with the local people and ability to work for a longer period than the Government agencies. On the other hand, if the welfare organisations are supported by the Government through administrative and legislative procedures, their efforts will become more effective and sustaining in the long run.

It is paradoxical to note that West Bengal with its congenial ecological environment, traditional skill and ready market lags behind Karnataka in sericulture in India. Greater success and prosperity of Karnataka is mainly due to State initiative in providing necessary infra-structural facilities to the sericulturists and bringing them under integrated system of production mechanism. The backwardness of West Bengal is the legacy of long continued neglect and apathy of the State to look after the problem at appropriate time. Sectoral growth and private rivalries are other contributory factors. Recently these problems have been realised by the State Government as well as by the people associated with this productive system. Correlative measures are being taken to overcome them. If a collaboration is achieved between the various sectors of this industry as well as between the various organisations or persons associated with this productive mechanism, West Bengal may reasonably hope to regain its former glory and can possibly hope to become the foremost silk producing State in this country.

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